

CALTCM 2014

Innovation to Action

Care of Wounds, Dementia and COPD

Promoting quality patient care through medical leadership and education

May 2-3, 2014

Omni Los Angeles Hotel at California Plaza
Los Angeles, CA



Program Introduction

2014 is the year of QAPI (Quality Assurance Performance Improvement) implementation throughout our country. With that in mind, we have designed our meeting for practical training for key players in your facility in areas where LTC has struggled to improve quality. To help you implement QAPI, we have designed innovative case-based half-day workshops for your facility (or virtual facility) designed to help you put this new knowledge into constructive and sustainable action for the benefit of your patients.

We have purposely chosen the care of Wounds and Dementia, since these are areas where prior quality efforts have often had disappointing results. To facilitate interactive learning, we have chosen a round table format for all of our workshops.

In addition, knowing that our hospital partners are being penalized for early relapse of COPD patients, we bring to you advances in COPD care focused on reducing the 30 day relapse rate through integrated care models.

We anticipate another delightful Poster session where we will not only learn from organized presentations on facility innovation, but also have opportunities to discuss the project with the author(s).

An additional highlight will be the collegial working relationships that develop around the tables at our annual meeting.

Bring your team, enjoy the interactive learning, and return home reinvigorated for with actions that fulfill the QAPI mandates.

Program Learning Objectives

1. The participant will develop QAPI skills that they will then implement in specific action plans in their facilities;
2. The participant will identify at least 3 QAPI performance improvement projects for implementation in the coming year;
3. The participant will better understand models of improving care integration, the incentives for improving this care, and then make specific decisions about how they will improve care integration in their facilities.

CALTCM Annual Meeting Accreditation Statement

Continuing Medical Education (CME)

The California Association of Long Term Care Medicine (CALTCM) is accredited by the Institute for Medical Quality/California Medical Association (IMQ/CMA) to provide continuing medical education for physicians.

The California Association of Long Term Care Medicine (CALTCM) designates this Live activity for a maximum of 10 *AMA PRA Category 1 Credit(s)*[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity. This credit may also be applied to the CMA Certification in Continuing Medical Education.

This course complies with Assembly Bill 1195 Continuing Education: Cultural and Linguistic Competency.

American Academy of Family Physicians (AAFP)

This live activity, CALTCM 40th Annual Meeting: Innovation to Action: Care of Wounds, Dementia, and COPD, with a beginning date of May 2, 2014, has been reviewed and is acceptable for up to 10 Prescribed credits by the American Academy of Family Physicians. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Board of Registered Nursing (BRN)

SCAN Health Plan® is a provider approved by the California Board of Registered Nursing (Provider #CEP-13453). This activity has been approved for up to 10 contact hours.

California Board of Behavioral Sciences (BBS)

Course meets the qualifications for 10 hours of continuing education credit for MFT's and/or LCSW's as Required by the California Board of Behavioral Sciences (BBS). California Association of Long Term Care Medicine (CALTCM) BBS Provider No. PCE-3077.

American Medical Directors Certification Program (AMDCP)

This course has been approved for up to 1.75 credit hours of clinical education and 8.25 credit hours of Management education toward certification or recertification as a Certified Medical Director in Long Term Care (AMDA CMD). The AMDA CMD program is administered by the American Medical Directors Certification Program (AMDCP). Each physician should claim only those hours actually spent on the activity.

Nursing Home Administrators Program (NHAP)

CALTCM Annual Meeting: Dementia Workshop has been approved by the Nursing Home Administrator Program for up to 4.0 hours of NHAP credit. Course approval number: 1699004-4399/P

CALTCM Annual Meeting: QAPI Workshop has been approved by the Nursing Home Administrator Program for up to 3.0 hours of NHAP credit. Course approval number: 1699003-4403/P

CALTCM Annual Meeting: COPD Workshop has been approved by the Nursing Home Administrator Program for up to 3.0 hours of NHAP credit. Course approval number: 1699003-4404/P

Continuing Pharmaceutical Education

SCAN Health Plan® is accredited by the California Accreditation of Pharmacy Education (CAPE) as a provider of continuing pharmacy education. Pharmacists completing this course on 5/2/2014-5/3/2014 will receive up to 10.00 hours of credit through SCAN Health Plan® (CAPE Provider #199). CEU credits are also accepted by the Pharmacy Technician Certification Board (PTCB) to meet re-certification requirements (please retain program brochure and the certificate in event of an audit).

This course meets multiple requirements of the California Business and professions Codes 2190–2196.5 for physician CME, including cultural competency and geriatric credits.

Special Acknowledgements

CALTCM would like to extend our gratitude to all our sponsors

This program is supported in part by co-sponsorships from

American Society of Consultant Pharmacists—California Chapter
SCAN Health Plan®

Additional Co-Sponsorships

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Karl E. Steinberg, MD, CMD

Jennifer Wieckowski, MSG

Program Faculty

Debra Bakerjian, PhD, RN, FNP

Vice Chair for FNP/PA Studies, Department of Family and Community Medicine, Assistant Adjunct Professor, Betty Irene Moore School of Nursing University of California, Davis

Mary Ellen Dellefield, PhD

Researcher, VA San Diego Healthcare System

Shawkat Dhanani, MD, MPH

Associate Chief of Staff, Geriatrics & Extended Care Director, Geriatric Evaluation & Management Unit, VA Greater Los Angeles Healthcare System Clinical Professor of Medicine, UCLA

David Farrell, MSW, LNHA

Senior Director, The Green House Project

Rebecca C. Ferrini, MD, MPH, CMD

Medical Director, Edgemoor Hospital, Santee, CA, Co-Chair, CALTCM Education Committee

Timothy Gieseke, MD, CMD

Multi-Facility Medical Director, Santa Rosa, CA; Associate Clinical Professor, University of California, San Francisco; Chair, CALTCM Education Committee

Janice Hoffman, Pharm.D., CGP, FASCP

Professor of Pharmacy Practice and Administration, Western University of Health Sciences, College of Pharmacy

Program Faculty (continued)

Jim Jordan

Administrator, Asbury Park Nursing and Rehab

Wendy Liu, RN

Registered Nurse, Edgemoor Hospital

Ken Lund

President and CEO Kennon S. Shea & Associates

James Mittelberger, MD, MPH, CMD, FACP

Chief Medical Officer, Evercare Hospice and Palliative Care/Optum,
CALTCM President

Dan Osterweil, MD, FACP, CMD

Vice President/Medical Director, SCAN Health Plan; Founder of S+AGE program in Sherman Oaks; Immediate Past President of CALTCM; Associate Director and Clinical Professor in the Multicampus Program in Geriatrics and Gerontology at the UCLA David Geffen School of Medicine

Karl E. Steinberg, MD, CMD

Medical Director, Kindred Village Square Transitional Care & Rehabilitation Center, San Marcos, CA; Medical Director, Life Care Center of Vista, Vista, CA; Editor-in-Chief, Caring for the Ages; Vice Chair, AMDA Public Policy Committee; Vice President, Coalition for Compassionate Care of California, CALTCM Secretary

Jennifer Wieckowski, MSG

Program Director, Care Transitions, Health Services Advisory Group of California, Inc.

Faculty Bios

Debra Bakerjian, PhD, FNP, RN, FAANP

Senior Director for Nurse Practitioner and Physician Assistant Clinical Education and Practice
Assistant Adjunct Professor

Debra Bakerjian is senior director for nurse practitioner and physician assistant clinical education and practice, as well as an assistant adjunct professor, at the Betty Irene Moore School of Nursing at UC Davis. Previously, Bakerjian was a Betty Irene Moore School of Nursing Postdoctoral Fellow with specialties in health policy and system change.

Bakerjian's research aims to maximize the role of advanced practice nursing and improve the quality of care for aging populations. Her research focuses on the role of nurse practitioners and physician assistants; patient safety and quality improvement practices in long-term care, particularly nursing homes; care transitions between acute-care facilities, nursing homes and assisted living centers; pressure ulcer prevention and management; pain management; chronic disease management in frail older adults; and interprofessional education and practice.

Bakerjian was a Pat Archbold Predoctoral Scholar and a Claire M. Fagin Postdoctoral Fellow at UC San Francisco in the Department of Social and Behavioral Sciences, where she was also an assistant adjunct professor. She earned a Doctor of Philosophy in Health Policy and Gerontology in 2006 and a Master in Science of Nursing in 1992, both from UC San Francisco School of Nursing. Her doctoral study, "Utilization of Nurse Practitioners in Nursing Homes: A Comparison with Physicians," received the 2006 Dissertation of the Year Award at UC San Francisco. Bakerjian earned a Family Nurse Practitioner and Physician Assistant certificate from the UC Davis School of Medicine in 1991 and a Bachelor of Science in Health Services Administration from the University of Phoenix in 1983. She received an Associate Degree in Nursing from Evergreen Valley College in San Jose, Calif., in 1977.

Bakerjian is active in both state and national organizations associated with the care of older adults. She serves on the board of directors for Advancing Excellence in American Nursing Homes' and on the National Quality Forum's Skilled Nursing Facility Technical Expert Panel for Serious Reportable Events and Common Formats. She is on the Health Sciences Executive Committee of the Gerontological Society of America and the Quality Measures Committee for the American Geriatrics Society. She is also chair of the Nursing Home Special Interest Group and past president of the Gerontological Advanced Practice Nurses Association and current president of the Gerontological Advanced Practice Nurses Association Foundation. She serves on the executive committee and is the incoming president of the California Association of Long Term Care Medicine. She is also a member of the advisory committee for the American Medical Director's Association Clinical Practice Guidelines.

Contact Information: Phone: (916) 734-2145 | E-mail: Debra.Bakerjian@ucdmc.ucdavis.edu

Faculty Bios

Mary Ellen Dellefield, PhD, RN

Mary Ellen Dellefield, PhD, RN is a Research Nurse Scientist at VA San Diego Healthcare System. She is a Clinical Professor at the Hahn School of Nursing and Health Sciences in San Diego, California and a Hartford Gerontological Nurse Leader. Dr. Dellefield has worked as a Director of Nursing, Director of Staff Development, Infection Control Nurse, staff nurse, and Minimum Data Set Nurse Coordinator over the past 25 years in San Diego county nursing homes. Her research area of interest includes pressure ulcer prevention in nursing homes, registered nurse practice in nursing homes, evidence-based practice, and the care planning process. Dr. Dellefield has written numerous articles in peer reviewed journals and book chapters.

Shawkat Dhanani, MD

Dr. Dhanani is a Clinical Professor of Medicine at UCLA and Associate Chief of Staff for Geriatrics and Extended Care at the VA Greater Los Angeles Healthcare System.

He is also the Director of Geriatric Evaluation & Management Unit at the VA Greater Los Angeles Healthcare System and is fellowship trained in both Geriatric and Pulmonary Medicine.

David Farrell, MSW, LNHA

David Farrell, M.S.W., L.N.H.A., is a licensed nursing home administrator who has spent his entire career in the long-term care profession. He started as a certified nursing assistant in order to earn extra money while attending college. That experience inspired him to pursue a Master's degree in Social Work with a concentration in Gerontology and Administration from Boston College. In the 25 years he has served as a nursing home administrator and regional director of operations, David has advocated for patient-centered care using quality improvement practices. A published author and member of the Board of Directors at the Pioneer Network, his award winning book, "Meeting the Leadership Challenge in LTC: What You Do Matters!" co-authored with Barbara Frank and Cathie Brady, has received widespread acclaim. Currently, David is the Senior Director of The GREEN HOUSE Project where he helps spread the evidence-based Green House Model across the U.S.

Faculty Bios

Rebecca Ferrini, MD, MPH, CMD

Medical Director, Edgemoor DP SNF

Rebecca L. Ferrini, MD, MPH, CMD is the full-time medical director of Edgemoor Hospital DP SNF in Santee, California, a government run 192-bed facility which cares for a younger long-term care population with extensive physical, psychosocial and psychiatric challenges. She was honored in 2009 as the AMDA Medical Director of the Year for her role in improving the quality of care at the facility. She has special interest in consent and capacity, Huntington's Disease, and behavioral management.

Timothy Gieseke, MD, CMD

Dr. Gieseke graduated AOA from UCI in 1976 and then completed a straight Internal Medicine at UCD, Sacramento Medical Center. Since 1979, he has practiced internal medicine in Santa Rosa with an emphasis on gerontology and palliative care. He left his office practice in 2005 to focus full time on LTC medicine. He teaches LTC medicine at the Sonoma County UCSF affiliated Family Medicine Residency where he is an Associate Clinical Professor. He is a past Associate Medical Director for Sutter VNA Hospice. He is a CMD and has been a Medical Director of CCRC since 1986 and is currently a Medical Director for 4 other SNFs.

He was President of CALTCM (California Association of Long Term Care Medicine) July 2005-2007, and is the Chairperson of the Education committee since last May and was the Chair from July 2008 to July 2010. He is a member of the POLST physician leadership council and was a member of the state taskforce for developing the CARE recommendations for LTC. CARE stands for Compassion and Respect at the End of Life. He has presented on Culture Change, the POLST, the CARE Recommendations, and Diabetes care at CALTCM annual meetings and the POLST/CARE at AMDA annual meetings. He has been involved in CARE Transition projects in Sonoma County and has been a faculty participant in INTERACT workshops and subsequent implementation projects.

He has been interested in international medicine since participating in a medical project in Ecuador in 1990. He subsequently has been a participant on 16 medical educational projects in Albania and 2 in Pristina, Kosovo.

Faculty Bios

Janice Hoffman, PHARM.D. CGP, FASCP

Dr. Janice Hoffman is a Certified Geriatric Pharmacist and a Fellow of the American Society of Consultant Pharmacist. She is an Associate Professor of Pharmacy Practice and Administration for Western University of Health Sciences and her clinical practice sites are S+AGE clinic and at Jewish Home for the Aging where she is a clinical consultant. She received her Pharm.D. from the University of Southern California and completed a specialty Residency in Clinical/Administrative Psychiatric Pharmacy Practice with an emphasis in geriatrics from the University of Maryland at Baltimore. She is currently President for the American Society of Consultant Pharmacists – California Chapter and on the Board of Directors for the Academy of Long-Term Care Pharmacists as well as the Editorial Review Committee for the California Pharmacists Association. Her areas of interest and research include: geriatric psychiatry, interdisciplinary health care teams and complementary herbal medications.

James Jordan

Administrator, Asbury Park Nursing & Rehab

Wendy Liu, RN, BSN, PHN

Wendy Liu is a Registered Nurse at Edgemoor Skilled Nursing Facility in Santee, California. Ms. Liu has worked in long-term care facilities for four years, and she loves to work with the geriatric population. Her passion in helping the elderly stemmed from living and caring for her grandparents while she was a child.

Born in China, her family immigrated to the United States in 1990. Ms. Liu was raised in the City of Alhambra in the Los Angeles Area. Ms. Liu's education includes undergraduate degrees in Biochemistry from UCLA and Nursing from Azusa Pacific University, and a Master's degree in Biochemistry from Cal State Los Angeles. Her hobbies include eating out with her husband, watching Chinese dramas, and visiting social media websites on the internet. Ms. Liu's goals are to strengthen and utilize her skills in challenging positions which will afford advancement and professional growth.

Faculty Bios

Ken Lund, CEO

As CEO of Shea Family since 2010, Ken transitioned a traditional custodial based nursing company into a leading edge post-acute provider offering a single point of entry to a full array of services throughout the healthcare continuum. With over 30 years of experience in top management industries ranging from banking, real estate to nationwide distribution, Ken has spent the last decade revitalizing senior living and skilled nursing companies using a lifestyle and service based approach. Accomplishments have included: As CEO of Westlake Senior Living, increasing the market value from \$50M to \$120M in less than two years by changing their industry paradigm. Over the same period, occupancy rates climbed from 65% to 98% and customer satisfaction increased from 50% to 95%. While at Shea, he has repositioned the company into a true post-acute recovery continuum, by adding complementary businesses and support services that function as independent profit centers while enhancing continuity of care. Ken has a BBA in Finance and Human Resources from Pacific Lutheran University in Tacoma, WA.

James Mittelberger, MD, MPH, CMD

Dr. James Mittelberger MD MPH CMD FACP has 30 years of ongoing active clinical practice in the fields of Internal Medicine, Geriatric Medicine and Palliative Care and Hospice. He has over 20 years experience as Chief of a Division of Geriatrics and Palliative Care at the Alameda County Medical Center including specialty geriatrics & dementia clinics. clinical experiences include over 25 years as a nursing home medical director, physician home care, hospitalist medicine. Leadership and management roles have included health clinic medical director, medical staff president, President of Oakcare Medical Group, a multi-specialty medical group, Interim CEO of the Alameda County Medical Center, founding board member and Chair of the Board of the Alameda Alliance for Health and regional CMO for a United Healthcare's Medicare division. His training includes an MPH in health services, a faculty development fellowship in Clinical Ethics, and a CHCF leadership fellowship. He is currently national CMO of the Optum Palliative and Hospice Care and a Senior medical director for Optum as well as CALTCM President.

Faculty Bios

Dan Osterweil, MD, FACP, CMD

Dan Osterweil, MD, FACP, Msc Ed., CMD, Vice President/Medical Director, SCAN Health Plan and Professor of Medicine at UCLA, completed a geriatrics fellowship at UCLA. Dr. Osterweil is the founder of the Specialized Ambulatory Geriatric Evaluation (S+AGE™) Clinic, a community-based, geriatric assessment center in Sherman Oaks. He is the Emeritus-editor of the Journal of the American Medical Directors Association (JAMDA) in which he has founded. He is a member of the editorial board of *Caring for the Ages*. Dr. Osterweil co-authored two editions of *Medical Care in the Nursing Home*, is the co-editor of *Comprehensive Geriatric Assessment*, and has published over 60 articles in peer-reviewed journals. His areas of expertise include cognitive and functional assessment, management of dementia, and continuous quality improvement in the nursing home, planning and implementation of the work processes in the nursing home, in-depth knowledge of nursing home state and federal regulations, and practice innovations. Dr. Osterweil is Director of a UCLA training program entitled Leadership and Management in Geriatrics (LMG) and Associate Director of the Multicampus Program in Geriatrics and Gerontology at UCLA (MPGMG).

Karl Steinberg, MD, CMD

Dr. Karl Steinberg is an experienced clinician with over 20 years in practice in San Diego County. He is a geriatrician and board-certified family physician with a subspecialty certification in hospice and palliative medicine. He serves as chief medical officer for Shea Family Health, an El Cajon-based nursing home and post-acute care chain, medical director of two other skilled nursing facilities, Kindred Village Square and Life Care Center of Vista, and medical director of Hospice by the Sea in Solana Beach. Dr. Steinberg has been a nursing home medical director and hospice medical director since 1995 and is probably best known for taking his dogs on rounds with him almost every day.

Dr. Steinberg got his undergraduate degree in biochemistry and molecular biology from Harvard in 1980, then taught high school in New York City for three years. He attended medical school at The Ohio State University, graduating in 1987, then completed his family medicine residency at UCSD in 1990. Dr. Steinberg serves as voluntary faculty and community preceptor for UCSD and Naval Hospital Camp Pendleton's family medicine residency programs as well as for Samuel Merritt's P.A. program, Point Loma Nazarene's Clinical Nurse Specialist program, and others. He also has an appointment as adjunct faculty for Case Western Reserve University's graduate school of biomedical engineering, where he teaches a course on the U.S. healthcare system.

(Dr. Steinberg's Bio is continued on the next page)

Faculty Bios

Karl Steinberg, MD, CMD (continued)

Dr. Steinberg is the Editor-in-Chief of *Caring for the Ages*, a monthly periodical with a print circulation of 25,000, on behalf of the American Medical Directors Association (AMDA). He is on AMDA's board of directors and serves as vice chair of AMDA's Public Policy Committee, as well as vice chair of the Compassionate Care Coalition of California. He is secretary and past president of the California Association of Long Term Care Medicine (the California chapter of AMDA, called CALTCM). Dr. Steinberg is also CEO of Stone Mountain Medical Associates, Inc., a consulting company, and serves as an expert consultant in legal, regulatory, quality and risk management matters.

Among Dr. Steinberg's professional interests are advance care planning, palliative care, care transitions, dementia, depression, bioethics and addiction medicine. In his extensive spare time, Dr. Steinberg enjoys playing tennis and guitar, traveling, photography, hanging out with his dogs (including taking them on nursing home rounds), and running on a treadmill while playing Words With Friends and listening to classic rock.

Jennifer Wieckowski, MSG

Program Director, Care Transitions
Health Services Advisory Group

Jennifer Wieckowski currently serves as Program Director, Care Transitions, for Health Services Advisory Group of California, the Medicare Quality Improvement Organization. In this position, she is responsible for working with communities throughout California to improve care transitions across health care settings and reduce statewide readmissions. Her previous role at HSAG was the Director, Nursing Homes, Patient Safety in which she directed and implemented quality improvement activities with nursing homes throughout the state. Prior to joining HSAG, Ms. Wieckowski managed several federal Administration on Aging and National Council on Aging research projects of the California Health Innovation Center at Partners in Care Foundation investigating the delivery of evidence-based disease prevention programs throughout California. Jennifer's passion for the aging field began at the age of eleven when she began volunteering in adult day health care programs and nursing homes. After volunteering for seven summers at multiple healthcare settings, Jennifer pursued her Bachelor of Science Degree from Cornell University in Human Development and Family Studies, with a certificate in Gerontology, and her Master of Science Degree in Gerontology from the University of Southern California. She resides in Valencia, California with her husband, Kris, daughter Allison (age four) and twin 18 month olds, Nick and Kelly.

Faculty and Planner Disclosures

Notice of Incorrect Disclosure

At the CALTCM 40th Annual Meeting - Innovation to Action: Care of Wounds, Dementia, and COPD, presented on May 2 - 3, 2014, incorrect information appeared in the Faculty and Planner Disclosures, and in COPD Q&A Panel Discussion. These sections should have contained the following information: “Dr. Steinberg has received honoraria for being on the non-branded speakers bureau for Boehringer Ingelheim. No other faculty or planners have any relevant financial relationships with a commercial interest to disclose. Activity planners have resolved the potential conflict of interest and determined the presentation is without bias.”

Faculty and Planner Disclosures

It is the policy of California Association of Long Term Care Medicine (CALTCM) to ensure balance, independence, objectivity, and scientific rigor in all of its sponsored educational programs. All faculty participating in any activities which are designated for *AMA PRA Category 1 Credit(s)™* are expected to disclose to the audience any real or apparent conflict(s) of interest that may have a direct bearing on the subject matter of the CME activity. This pertains to relationships with pharmaceutical companies, biomedical device manufacturers, or other corporations whose products or services are related to the subject matter of the presentation topic. The intent of this policy is not to prevent a speaker with a potential conflict of interest from making a presentation. It is merely intended that any potential conflict should be identified openly so that the listeners may form their own judgments about the presentation with the full disclosure of the facts. It remains for the audience to determine whether the speakers' outside interests may reflect a possible bias in either the exposition or the conclusions presented.

The following faculty and planners have indicated any affiliation with organizations which have interests related to the content of this conference. This is pointed out to you so that you may form your own judgments about the presentations with full disclosure of the facts. All conflicts of interest have been resolved in accordance with the ACCME's Standards for Commercial Support.

Faculty and Planners	Affiliation/Financial Interest	Name of Organization
Debra Bakerjian, PhD, RN, FNP	National Advisory Board	Omnicare Pharmacy
	Member National Quality Forum	Common Formats
Joseph Bestic, NHA, BA	None	
Mira Cantrell, MD	None	
Jodi Cohn, Dr. P.H.	None	
Heather D'Adamo	None	

Faculty and Planners (Continued)	Affiliation/Financial Interest	Name of Organization
Mary Ellen Dellefield, PhD	None	
Shawkat Dhanani, MD, MPH	None	
David Farrell, MSW, LNHA	None	
Rebecca Ferrini, MD, MPH, CMD	None	
Timothy Gieseke, MD, CMD	None	
Janice Hoffman, Pharm.D, CGP, FASCP	Grant	Novartis
Barbara Hulz	None	
Ashkan Javaheri, MD, CMD	None	
Jim Jensen, MHA, MA	None	
James Jordon	None	
Wendy Liu, RN	None	
Ken Lund	None	
Renee McNally	None	
James Mittelberger, MD, MPH, CMD, FACP	None	
Sheryl Nespor, PhD, FNP	None	
Dan Osterweil, MD, FACP, CMD	None	
KJ Page, RN, NHA, ND	None	
Glenn Panzer, MD	None	
Rajneet Sekhon, MD	None	
Karl Steinberg, MD, CMD*	Non-Branded Speakers Bureau*	Boehringer Ingelheim*
Jennifer Wieckowski, MSG	None	

*REVISED JUNE 2014

Program Schedule – Friday May 2, 2014

QAPI: Care of Wounds

Moderator: Dan Osterweil, MD, FACP, CMD

- 11:00 a.m. **Registration/Exhibits Open**
- 11:45 a.m. **Industry Supported Lunch**
- 1:00 p.m. **Welcome & Introductions** - James Mittelberger, MD, MPH, CMD, FACP
- 1:10 p.m. **Opening Comments** - Timothy Gieseke, MD, CMD
- 1:15 p.m. **QAPI Overview** - David J. Farrell, MSW, LNHA
- 1:45 p.m. **Wound Diagnosis and Management - Workshop**
Wound Diagnosis and Management - Case Study Presentation
Wound Diagnosis and Management - Small Group Discussion
Debra Bakerjian, PhD, RN, FNP, FAANP
- 2:30 p.m. **Break**
- 3:00 p.m. **Wound Diagnosis and Management - Interactive Lecture**
Debra Bakerjian, PhD, RN, FNP, FAANP
- 3:40 p.m. **Pressure Ulcer Prevention - Mary Ellen Dellefield, PhD**
- 4:00 p.m. **Action Planning Session - Wound Care**
- 4:30 p.m. **Q&A Panel Discussion - QAPI and Wound Care**
Debra Bakerjian, PhD, RN, FNP, FAANP; Mary Ellen Dellefield, PhD;
David J. Farrell, MSW, LNHA; James Jordan
- 5:30 p.m. **CALTCM Update**
- 6:00 p.m. **Poster Session & Reception | Exhibits Close**
- 7:00 p.m. **Industry Sponsored Dinner**

Program Schedule – Saturday May 3, 2014

Care of the Difficult Dementia Patient

Moderator: James Mittelberger, MD, MPH, CMD, FACP

- 7:00 a.m. **Exhibits Open**
- 7:00 a.m. **Breakfast**
- 8:00 a.m. **Welcome**
- 8:05 a.m. **Care of the Difficult Dementia Patient Upon Admission**
Case Study (Admission Presentation) - Timothy Gieseke, MD, CMD
Mock MDS Care Conference - Wendy Liu, RN
Small Group Discussions - Rebecca Ferrini, MD, MPH, CMD
- 9:00 a.m. **Care Planning for Difficult Patients**
Mary Ellen Dellefield, PhD
- 9:20 a.m. **Break/Exhibits**
- 9:50 a.m. **Reducing Inappropriate Antipsychotic Use in Dementia Care**
Janice Hoffman, PharmD, CGP, FASCP
- 10:20 a.m. **Difficult Dementia Cases, a Facility Specific Approach**
Rebecca Ferrini, MD, MPH, CMD
- 11:00 a.m. **Action Planning Session - Dementia Care**
- 11:25 a.m. **Q&A Panel Discussion - Dementia Care**
Mary Ellen Dellefield, PhD; Rebecca Ferrini, MD, MPH, CMD;
Timothy Gieseke, MD, CMD; Janice Hoffman, Pharm.D., CGP, FASCP;
Wendy Liu, RN

Program Schedule – Saturday May 3, 2014

Improving COPD Care in Long Term Care

Moderator: Karl E. Steinberg, MD, CMD

- 12:00 p.m. Exhibits**
- 12:00 p.m. Industry Supported Lunch**
- 1:00 p.m. CALTCM Awards**
- 1:30 p.m. Expanding Incentives to Improve Care**
Jennifer Wieckowski, MSG
- 1:45 p.m. Improving COPD Care in Long Term Care**
Timothy Gieseke, MD, CMD
- 2:05 p.m. COPD Care in Older Adults - Acute & Long Term Care Setting**
Shawkat Dhanani, MD, MPH
- 2:45 p.m. Break/Exhibits**
- 3:15 p.m. Quality and Efficiency Care Model**
Ken Lund
- 3:40 p.m. Green House Model for Post-Acute Care**
David J. Farrell, MSW, LNHA
- 4:15 p.m. Action Planning Session - COPD**
- 4:40 p.m. Q&A Panel Discussion: COPD Care and Integrated Care Models**
Shawkat Dhanani, MD, MPH; David J. Farrell, MSW, LNHA;
Timothy Gieseke, MD, CMD; Ken Lund; Jennifer Wieckowski, MSG

COPD

Saturday
May 3, 2014

Expanding Incentives to Improve Care

Jennifer Wieckowski, MSG
Program Director, Care Transitions
Health Services Advisory Group of
California, Inc.
(HSAG of California)



Objectives

- Prepare the business case to improve care integration across the settings of care
- Communicate clearly with stakeholders and staff the incentives and penalties for substandard care in the near future
- Define the next steps their facility should be taking to better prepare for these changes

Disclosure

- I have no relevant financial relationships with a commercial interest to disclose.

National Partnership for Patients



Reduce avoidable readmissions by 20 percent

Compared to 2010

Goal: 1.6 Million Patients Recover without Readmission

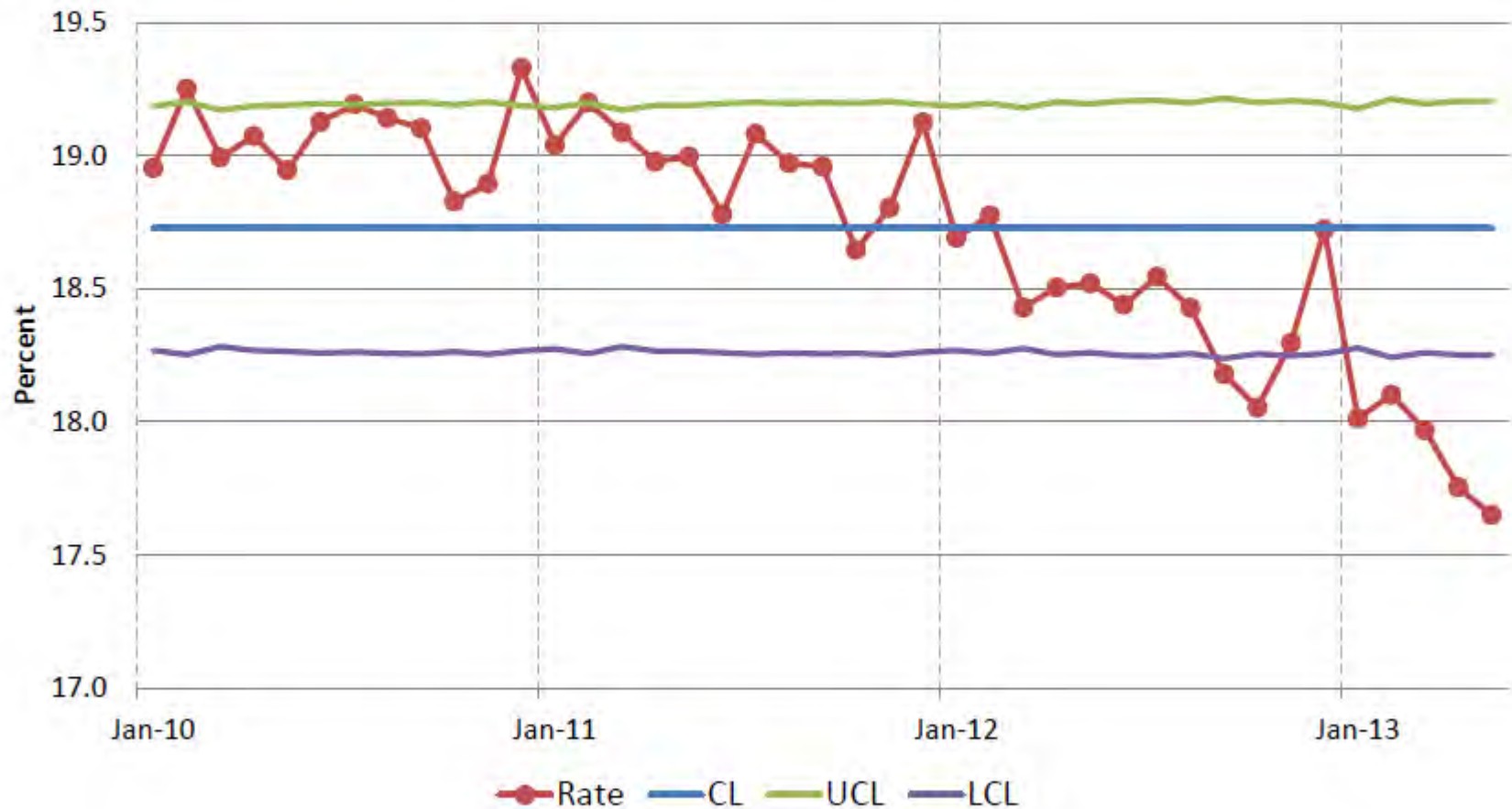
California's Goals

- Prevent 30,000 readmissions
- Decrease healthcare expenditures by \$450 million per year
- \$15,000 is the average cost of a readmission in California



Is the Nation Making Progress?

Nationwide Medicare All Cause 30-Day Hospital Readmission Rate



Source: Office of Information Products and Data Analytics, CMS

Hospital Readmission Penalties

- Section 3025, Affordable Care Act of 2010
- Effective October 2013, 204 California hospitals were penalized up to 2 percent for excess readmissions in congestive heart failure, acute myocardial infarction, or pneumonia.
- Penalties will increase to 3 percent October 2014 with chronic obstructive pulmonary disease and total knee and hip arthroplasty added to the penalty list.

Nursing Home Readmission Penalties

- Medicare Payment Advisory Commission (MedPAC) recommends nursing homes join in readmission penalties.
- SNFs with high rates of rehospitalizations will have payments reduced by 3 percent in 2017.
- MedPAC's recommendation is that bundled payment for post-acute care providers be implemented in 2018, including long-term care hospitals, SNFs, inpatient rehabilitation facilities and home health providers.

List of Hospitals Affected by HRRP

<http://www.kaiserhealthnews.org/Stories/2013/August/02/readmission-penalties-medicare-hospitals-year-two.aspx>

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Armed With Bigger Fines, Medicare To Punish 2,225 Hospitals For Excess Readmissions

TOPICS: HOSPITALS, MEDICARE, HEALTH REFORM, QUALITY

By Jordan Rau
KHN Staff Writer
AUG 02, 2013

Medicare will levy \$227 million in fines against hospitals in every state but one for the second round of the government's campaign to reduce the number of patients readmitted within a month, according to federal records released Friday.



Medicare identified 2,225 hospitals that will have payments reduced for a year starting on Oct. 1. Eighteen hospitals will lose 2 percent, the maximum possible and double the current top penalty. Another 154 will lose 1 percent or more of every payment for a patient stay, the records show. Hospitals that treated large number of low income patients were more likely to be penalized than those treating the fewest impoverished people.

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News from KHN

+ Topics

- HHS Awards Grants To Aid In Health Law Navigation 9:29AM ET
- Planned Parenthood Among Groups Tapped To Receive Health Law Grants 9:28AM ET
- Viewpoints: Medicare's Lessons For The Health Law; Krauthammer Says Obama Shouldn't Try To Write His Own Laws 9:06AM ET
- Capitol Hill Health Plan Fix Could

Kaiser Health News is a program of the Kaiser Family Foundation

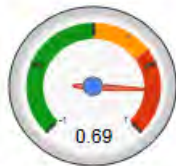
Get Widget

Readmission Rates By Condition:

The readmission rates for the selected hospital versus the national average are listed by condition. Below each graph, the patient total count for each condition is displayed. A condition that is below the national average is displayed in green. A condition at risk for penalty is displayed in red. The brown lines indicate the national average for each condition



Readmission Penalty:



Penalty: 0.69%
Percentile Rank: 83%

Due to the readmission rates of the conditions listed above, the selected hospital is subject to a 0.69% medicare reimbursement penalty. Ranked against other hospitals, the selected hospital is in the 83 percentile.

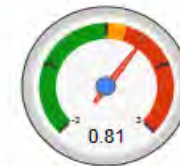
Value Based Purchasing Penalty:



Penalty: 0.12%
Percentile Rank: 74%

The hospital is subject to a 0.12% medicare reimbursement penalty.

Total Medicare Penalty:



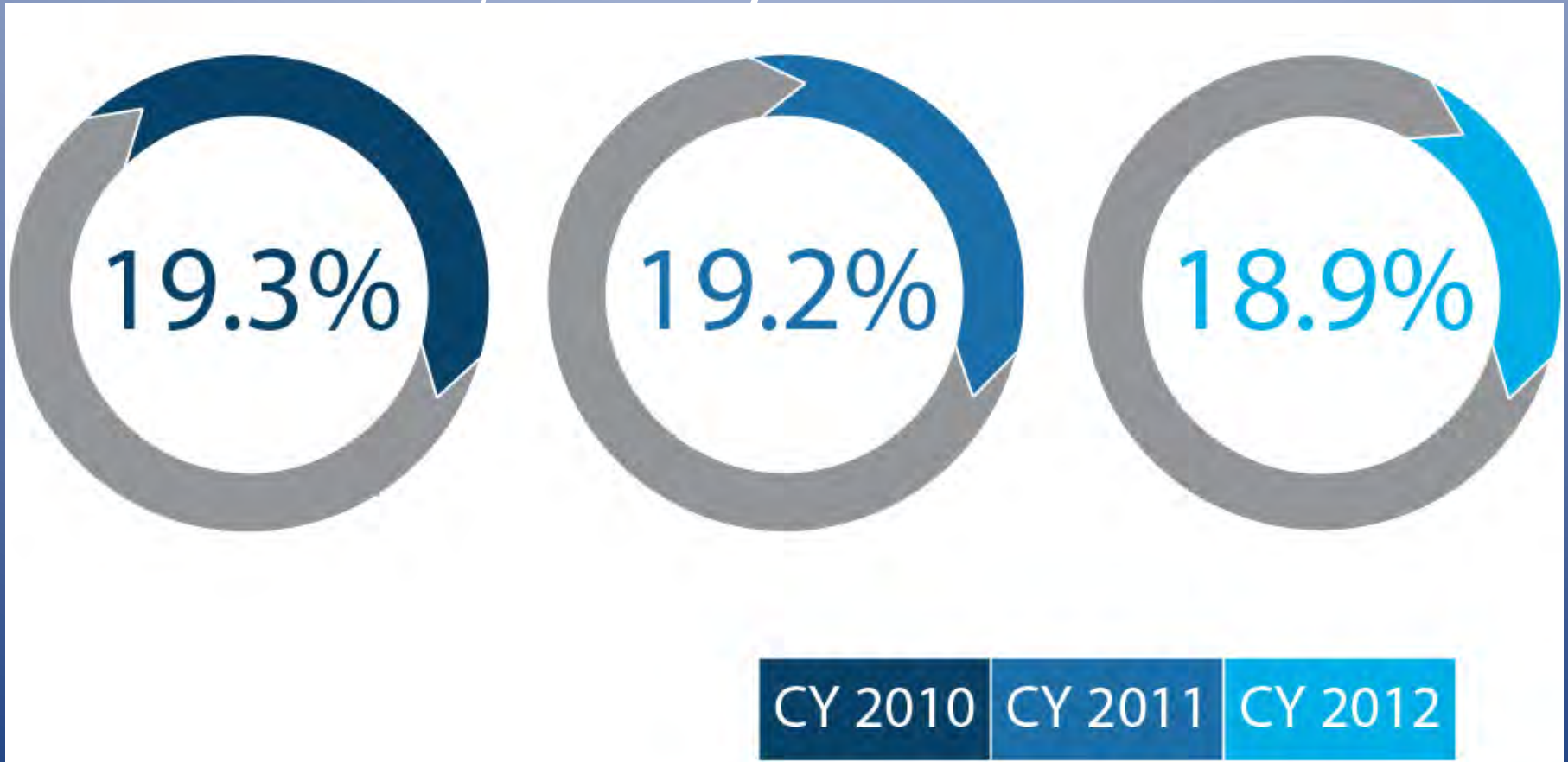
Total Penalty: 0.81%
Percentile Rank: 78.5%

The hospital is subject to a total 0.81% medicare reimbursement penalty.

Is California Making Progress?

California's Progress

All-Cause, 30-Day Readmission Rate

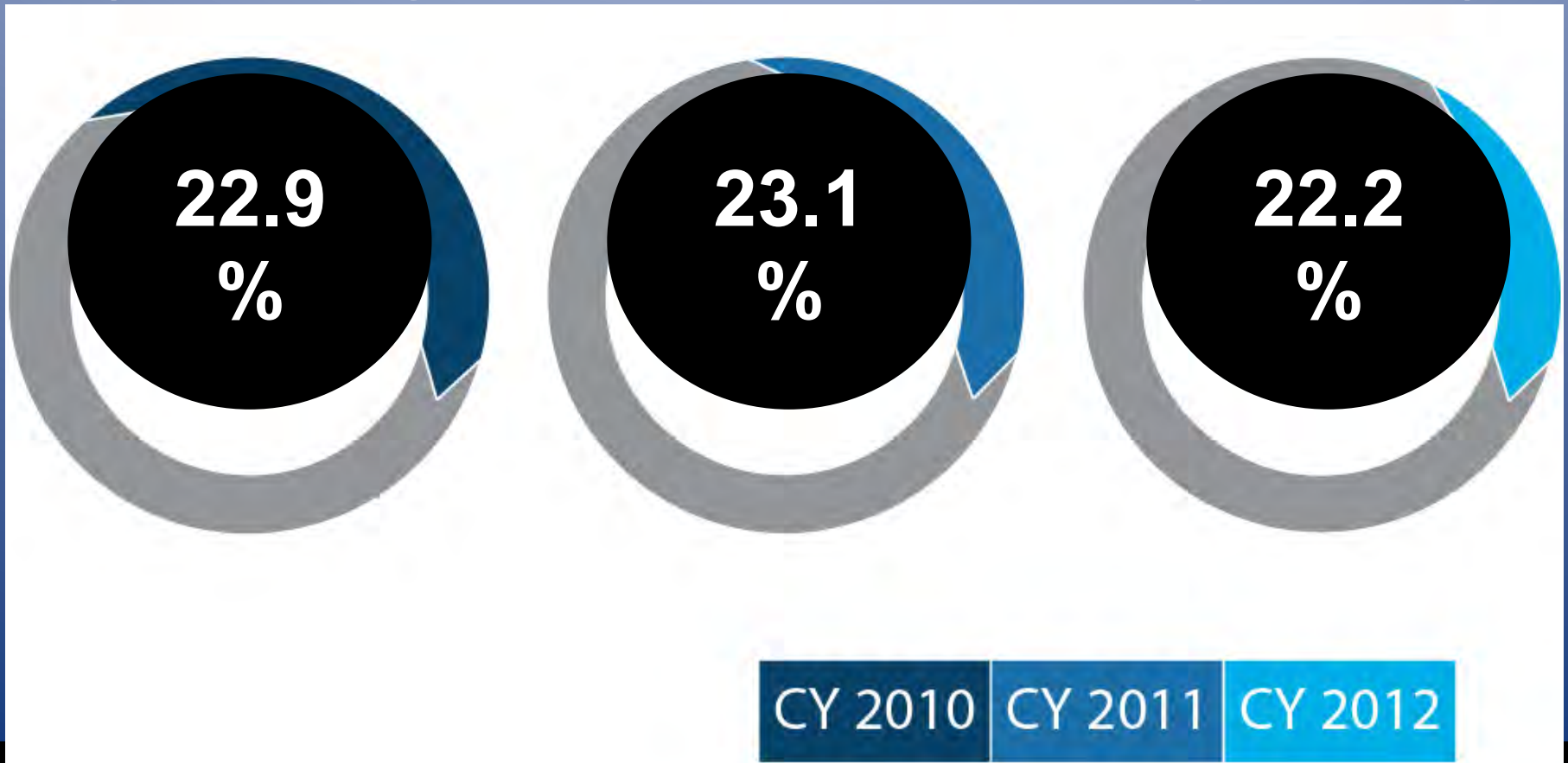


The ASAT data file representing calendar years (CYs) 2010–2012 was used for the analyses in this report. The ASAT data file is provided to HSAG of California, Inc. by the Centers for Medicare & Medicaid Services (CMS). The ASAT data file includes Part-A claims for FFS beneficiaries.

California All-Cause, 30-Day

Readmission Rate

(Discharge Disposition: Nursing Home)



The ASAT data file representing calendar years (CYs) 2010–2012 was used for the analyses in this report. The ASAT data file is provided to HSAG of California, Inc. by the Centers for Medicare & Medicaid Services (CMS). The ASAT data file includes Part-A claims for FFS beneficiaries.

California Medicare Fee-For-Service All-Cause 30-Day Readmission Rates

October 2012 to September 2013

Setting Discharged To	30-Day Readmission Rate
Home	17.1%
Home Health Agency	19.5%
Nursing Home	21.0%
All	18.4%

How Fast Are People Returning from Nursing Homes?



11,819 people are
readmitted within seven
days **(32.4%)**

5,185 people are
readmitted within three
days **(14.2%)**

Readmissions Campaign

www.NoPlaceLikeHomeCA.com



No Place Like Home

C A M P A I G N

... reducing hospital readmissions because there really is no place like home.

No Place Like Home

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| [Statewide Efforts](#)

| [Data](#)

| [Events](#)

| [Provider Resources](#)



Get Readmission Data Here!



Join California's Efforts to Reduce Hospital Readmissions NOW!

California Statewide, Regional and Hospital-Specific Readmission Data Reports

As the Medicare Quality Improvement Organization for California, the Centers for Medicare and Medicaid Services provides HSAG of California with Medicare Fee-for-Service Part-A data. HSAG of California analyzes the data and produces the following reports on a quarterly basis to assist community providers and hospital leadership in identifying gaps and opportunities for improvement:

- **Statewide readmission report:** Visit the [California Statewide Readmissions Data](#) page to download the report.
- **Regional readmission reports:** Visit the [California Regional Readmission Data](#) page to download the regional report of interest.
- **Hospital-specific readmission reports:** Hospital-specific reports are uploaded to each hospital's QNET account on a quarterly basis. The most recent report was uploaded in July 2013. For assistance downloading your report, please review the QNET instructions [here](#) or contact Michelle Pastrano.



Community Updates

Community coalitions are meeting across the state to reduce readmissions.

[Take part in this movement](#) and find a coalition near

HOT NEWS!

Readmission rates in these reports **are not** calculated using the 30-day risk standardized methodology for the CMS Hospital Readmission Reduction Program or on [Medicare Hospital Compare](#).

No Place Like Home Campaign Website Highlights



- Statewide and regional data reports
- Statewide events calendar
- Provider-specific tools
Submit your contact information to join California's efforts

Continuing the Journey

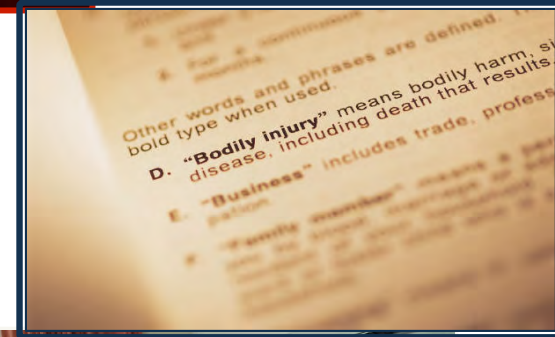
Patient-Centric, Community-Based Approach

Scroll over each sign to find more information.
For additions and edits to the toolkit, please contact the [National Coordinating Center](#).



Strategies to Reduce Readmissions

1. Improve processes within settings.
2. Improve processes between settings.



Our healthcare system operates in “silos,” is setting centered—*not* patient centered—and is incapable of reciprocal operation between organizations.

© Eric A. Coleman, MD, MPH



A close-up photograph of two hands, one from the left and one from the right, firmly grasping a blue flashlight. The hands are positioned as if they are about to turn the flashlight on. The background is a soft, out-of-focus green, suggesting an outdoor setting. The lighting is warm, highlighting the texture of the skin and the metallic finish of the flashlight.

**We Cannot Reach
Our Goal Without**

**Shared Accountability
Throughout the
Community.**

Ideas to Consider

- Contact local hospitals to start a community.
- Track and share your data.
- Share provider contact information.
- Establish communication expectations.
- Invite hospitals to tour your facility.
- When a readmission occurs, conduct a root cause analysis and call the hospital to discuss the case.

Interventions to Reduce Acute Care Transfers

- It's not just about SBAR and Stop and Watch
- Engage physicians and your medical director.
- Educate patients and families about the benefits and risks of going back to the hospital
 - INTERACT “Deciding About Going to the Hospital”
- <http://interact2.net/>



Quality Improvement Tools

Tracking Hospitalization Rates

 [Acute Care Transfer Log – Worksheet](#)

 [Hospitalization Rate Tracking Tool](#)

Quality Improvement Reviews - Root Cause Analyses

 [Quality Improvement Tool for Review of Acute Care Transfers](#)

Communication Tools

For Communication Within the Nursing Home

 [Stop and Watch Early Warning Tool](#)

For Communication Between the Nursing Home and Hospital

 [Engaging Your Hospitals - Tip Sheets](#)


 [Nursing Home Capabilities List](#)


 [NH - Hospital Transfer Form](#)


Decision Support Tools

 [Acute Change in Condition File Cards](#)


 [Acute Mental Status Change](#)

 [Change in Behavior: New or Worsening Behavioral Symptoms](#)


 [Dehydration](#)


 [Fever](#)


Advance Care Planning Tools

 [Identifying Residents Who May be Appropriate for Hospice or Palliative](#)

 [Comfort Care Order Set](#)

 [Deciding About Going to the Hospital](#)

 [Education on CPR](#)

 [Education on Tube Feeding](#)

Thank You!

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We convene providers, practitioners, and patients to build and share knowledge, spread best practices, and achieve rapid, wide-scale improvements in patient care; increases in population health; and decreases in healthcare costs for all Americans.

www.hsag.com

This material was prepared by Health Services Advisory Group of California, Inc., the Medicare Quality Improvement Organization for California, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy. Publication No. CA-10SOW-8.0-013114-01

COPD Case Study

Timothy L. Gieseke MD, CMD
Associate Clinical Professor, UCSF
Multi-facility Medical Director

Disclosure

- No one involved in the planning or presentation of this activity has any relevant financial relationships with a commercial interest to disclose.

Learning Objectives

At the conclusion of this activity, attendees will have the ability to:

- Define information necessary for proper assessment of the scope and severity of COPD
- Develop a care plan that accommodates the common accompanying Pulmonary illnesses, comorbidities, and social circumstances of patients with COPD
- Identify measures that insure optimal recognition and response to acute pulmonary infections in their facilities.

Case of R. B.

- 74 y/o with known COPD and idiopathic pulmonary fibrosis
- Hospitalized 6 times in 2013 by the time she's admitted to your SNF last October.
- She's homeless, free spirited, and feels best and most creative on Methamphetamines.
- She gave up "Met" after BP flare May 2013.
- The most recent flare of COPD may have been due to living in a friends room with "excessive mildew".

Hospital Care

- Managed with IV Solumedrol, Nebulized breathing treatments with Albuterol, and oral Levoquin and Azithromycin.
- CXR had changes of COPD and Pulmonary Fibrosis, but no infiltrate.
- She stabilized after 6 days and was transferred to Marilee Manor Post-Acute Healthcare for rehabilitation.
- She doesn't have a PCP and her pulmonary physician has retired.
- Pulmonary tests are not available from the referring hospital.

Initial SNF Evaluation

- Anxious, difficulty sleeping, and is SOB at rest with coughing paroxysms productive of purulent appearing sputum.
- Co-morbid:
 - HBP, Fibromyalgia, diarrhea predominant IBS, and Hepatitis C.
- 80 pack years of Cigarette smoking, but quit 3 years ago.
- Transfer Meds: Prednisone tapered off over 6 days, Levoquin 750 mg daily x 4 days, O2 at 2 LPM, Advair 500/50 bid, Ipratropian 2 qid, Albuterol HFA q4hr prn, ABTs with Albuterol q4hr prn, and Lisinopril 40 mg daily.

SNF Assessment Continued

- BMI 28, Resp 24, Pulse 95, SaO2 94% on 2 LPM
- Pursed lip breathing, poor dentition with gingival atrophy, and poor oral hygiene. The oral mucosa is pink. The chest has increased AP diameter, dorsal kyphosis, and is hyper resonant to percussion. She has wet bi-basilar rales with scattered generalized expiratory wheezing and rhonchi. The heart tones are distant, she has frequent premature beats, but not murmur or JVD. The extremities and back have no edema.
- CBC, CMP, and Protime are ok, but B-12 and 25 hydroxyl Vit D levels are low at 173 and 9 respectively. Both are replaced orally.

Care Planning

- On the **POLST Form**, she chooses: Attempt CPR, Full intensity treatment (intubation ok), and trial period of artificial nutrition by tube.
- She received SOMA tid prn and Norco 5/325 q4hr prn for her fibromyalgia symptoms
- She appeared to stabilize over the first 10 days at this SNF.

On day 10 Physician Visit

- Patient is quite concerned about her roommate who has developed coughing paroxysms and is disturbing both their sleep.
- This roommate is not your patient, but does seem weak, listless, pale, and weak.
- Patient appears stable.

2 days later....

- Rapid onset of sore throat, worsening cough, headache, weakness, and malaise.
- The temp is 100.2, but rest of vital signs appear stable including SaO₂'s. Her chest findings appear stable.
- Attending physician sent fax re: this COC.
- She is the 4th person on this unit in the past 2 days to have URI symptoms.
- Over the course of this day, she ate poorly, refused therapy, and complained of worsening SOB.
- By evening, she was quite anxious and demanded transfer to the ER.
- On-call physician contacted & approved this request.
- She was transferred and readmitted to the referring acute hospital.

Discuss Case at Your Tables

- Care Transition issues?
 - Facility Assessment
 - Care Planning
 - Infection Prevention
 - Management of COC (Change of Condition)
 - Other?
-
- 1 Spokesperson to summarize key discussion points.

Care Transition issues

- Hospital to SNF
- SNF to hospital
- Advance Care Planning
- 2. Facility Assessment and Care Plans
- 3. Opportunities to improve care
- 4. Management of the change of condition
- 5. Infection prevention issues

Treatment of Obstructive Pulmonary Disease

Shawkat Dhanani, MD, MPH

Director, Geriatric Evaluation & Management Unit

VA Greater Los Angeles Healthcare System

Clinical Professor of Medicine/Geriatrics

University of California, Los Angeles



Disclosure

- I have no relevant financial relationships with a commercial interest to disclose.

Learning Objectives

- Determine age associated changes in clinically important pulmonary physiology
- Choose appropriate treatment of stable COPD for each stage of the disease
- Differentiate between symptomatic treatment and life prolonging interventions in COPD
- Determine the appropriate management of COPD exacerbation
- Estimate prognosis in COPD patients

Age-Related Changes

Forced Exp Volume in 1 sec (FEV_1)	Decreases
Arterial PO_2	Decreases
A-a gradient	Increases
Arterial PCO_2 and pH	Unchanged
Response to hypoxemia/ hypercapnia	Decreases
Mucociliary clearance	Decreases

Calculation of PO₂

$$PO_2 \text{ (mm Hg)} = 100 - 0.325 \times \text{age (years)}$$

For example, in a healthy 80 year old person, normal PO₂ will be:

$$100 - 0.325 \times 80 = 74$$

Calculation of A-a Gradient

$$\text{A-a gradient} = (\text{Age} + 10) \times 0.25$$

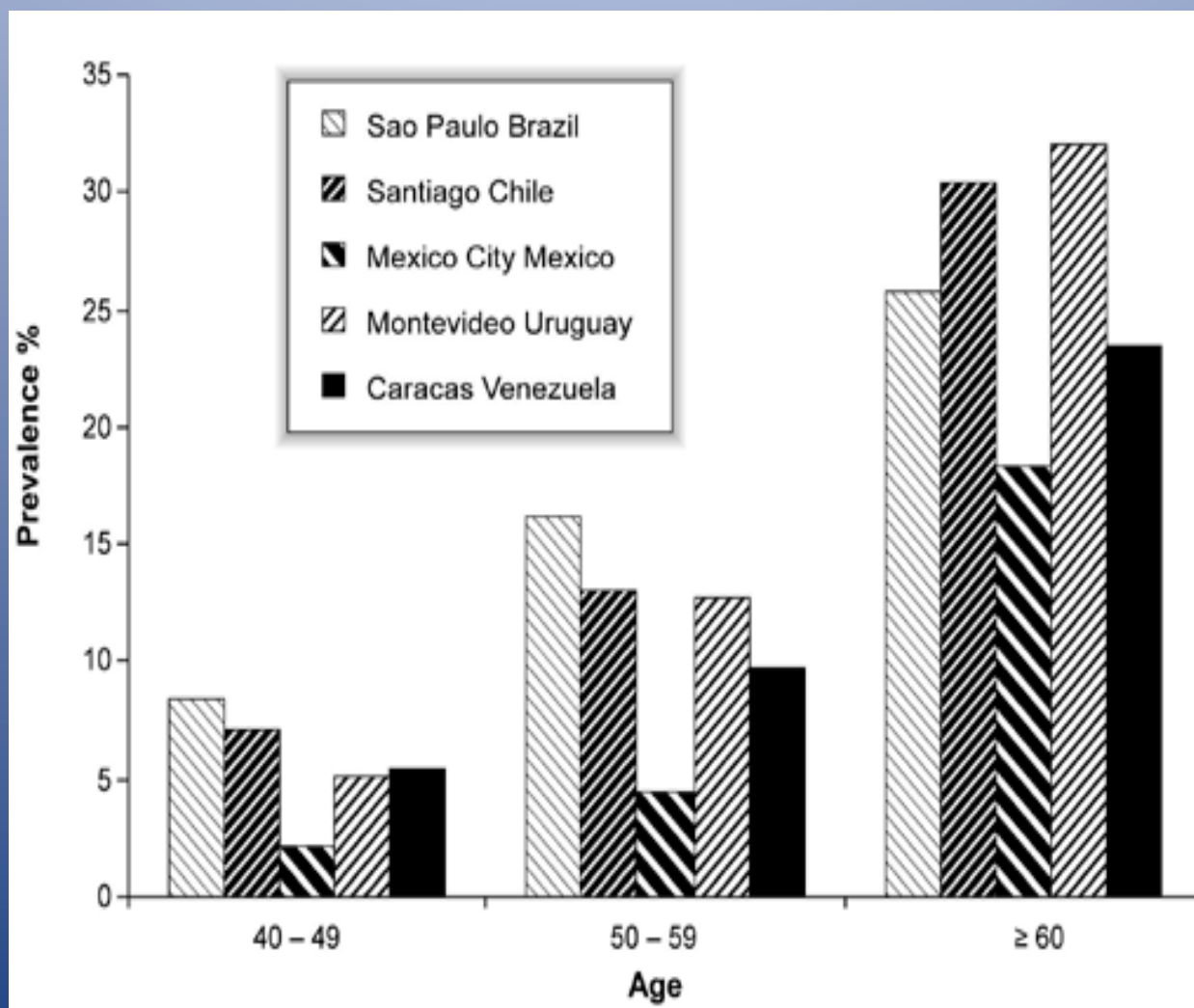
For example, in a healthy 80 year old person, normal A-a gradient will be:

$$(80 + 10) \times 0.25 = 22.5$$

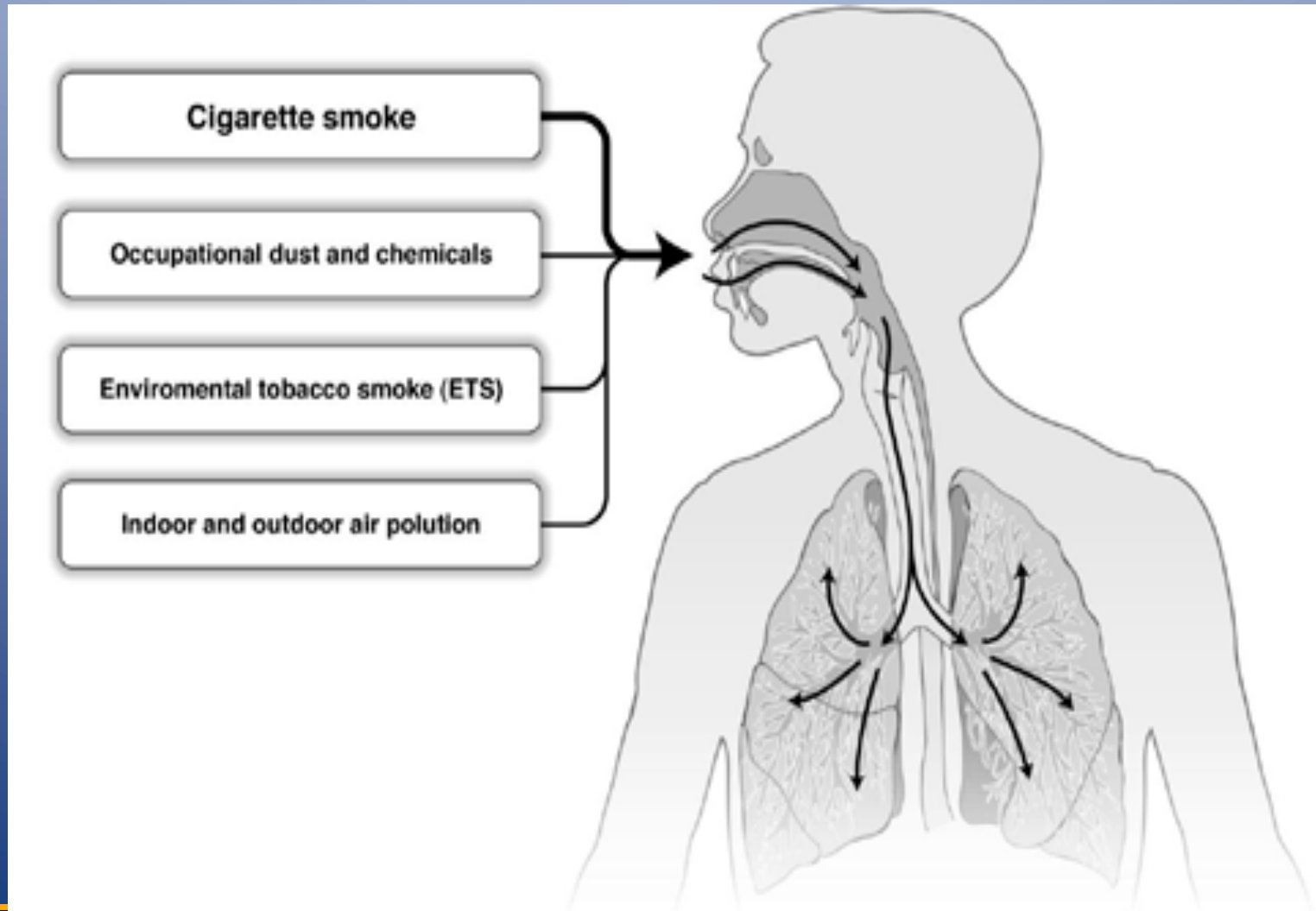
What is COPD?

- A common preventable and treatable disease
- Airflow limitation that is not fully reversible and usually progressive
- Associated with chronic airway inflammation
- Exacerbations and comorbidities contribute to the overall severity

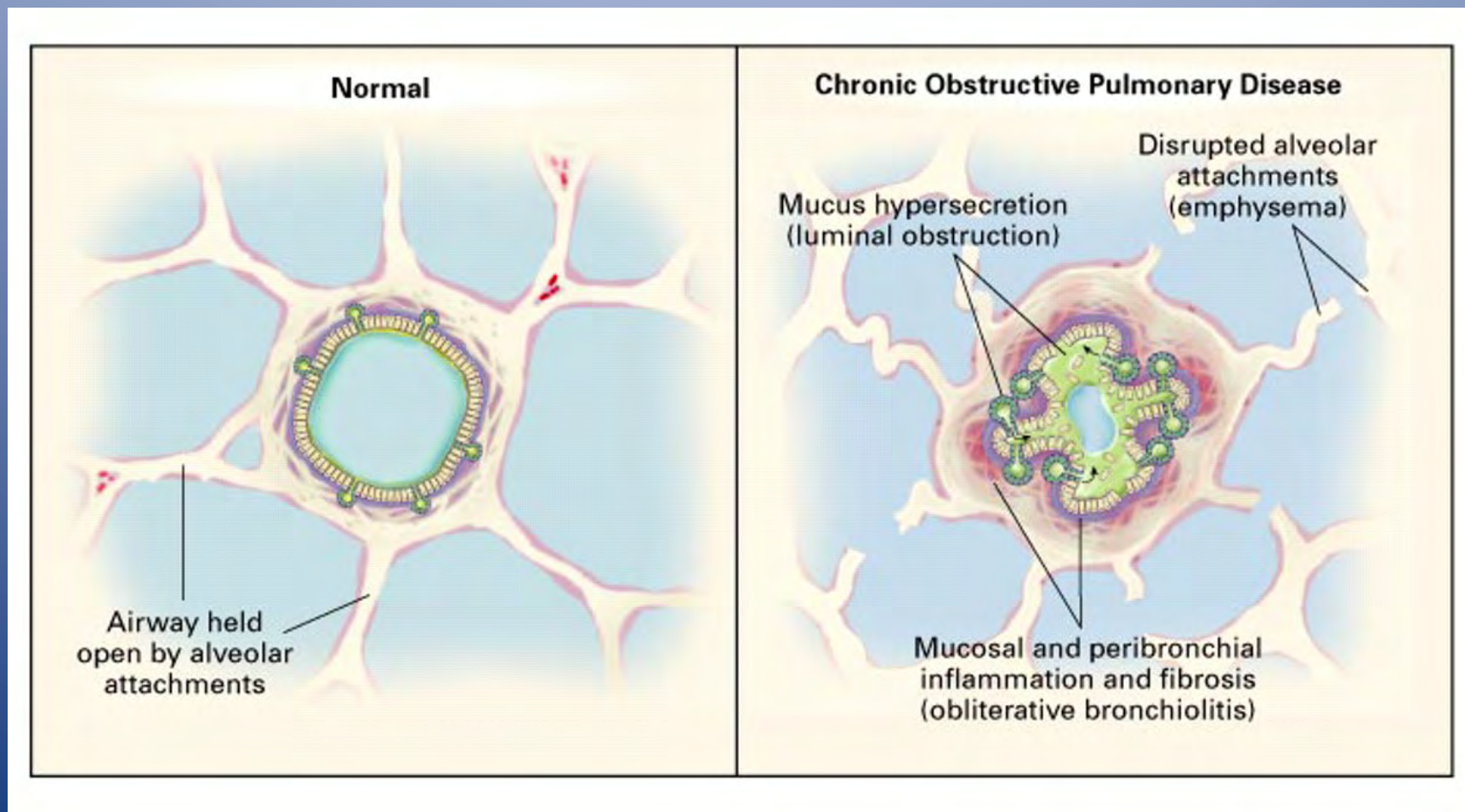
COPD Prevalence and Age



Causes of COPD

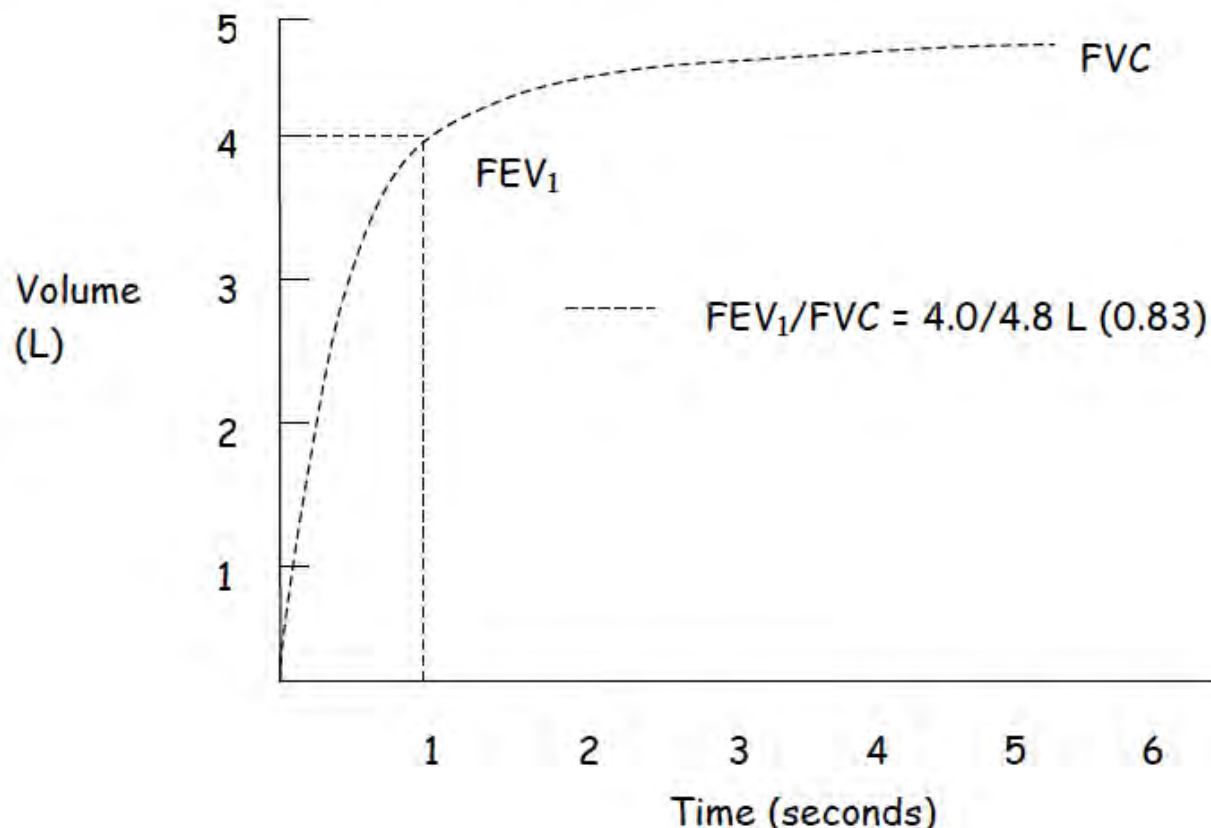


Pathophysiology leading to obstruction



Diagnostic Test: Spirometry

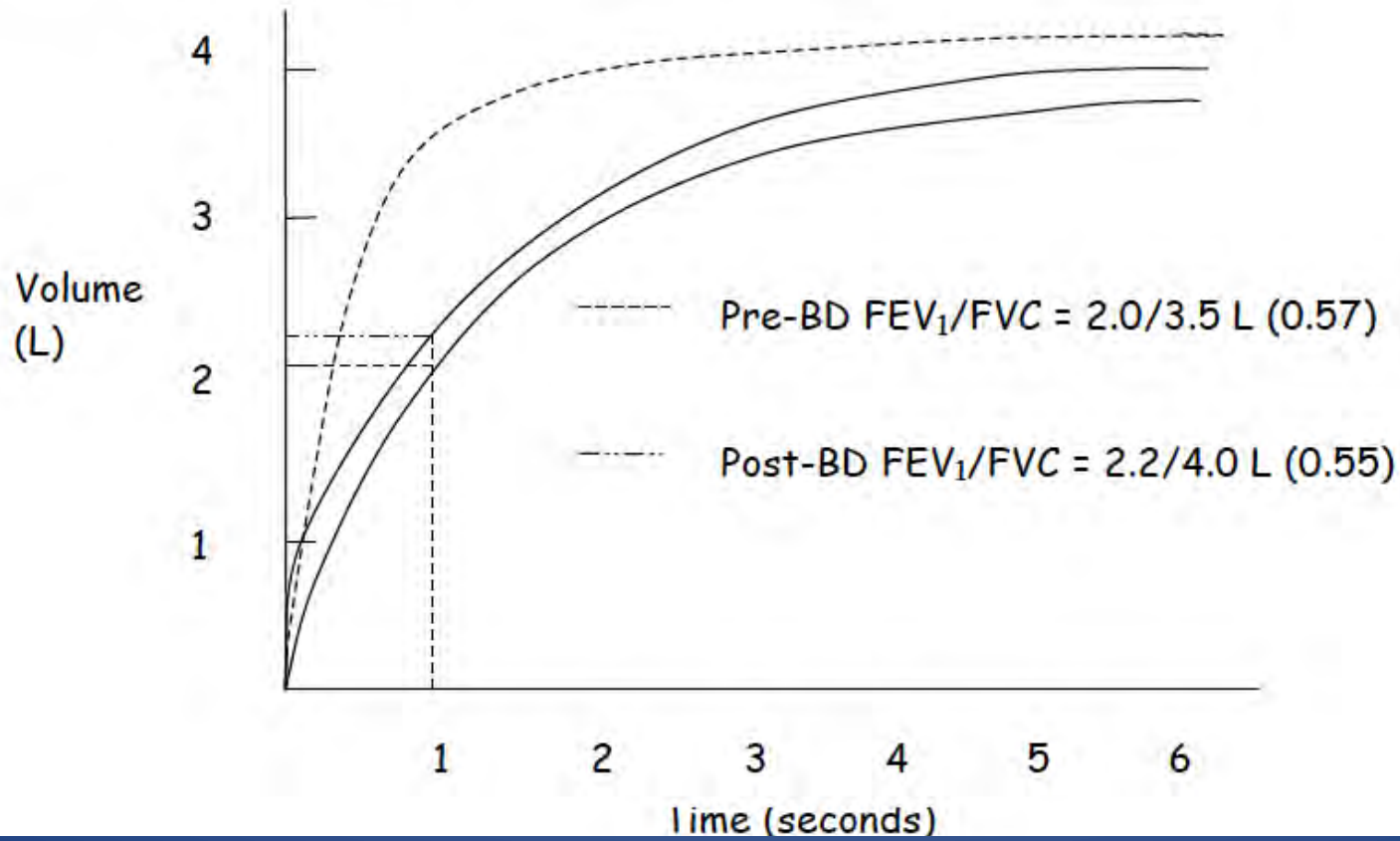
Figure 2. NORMAL SPIROGRAM: VOLUME-TIME CURVE



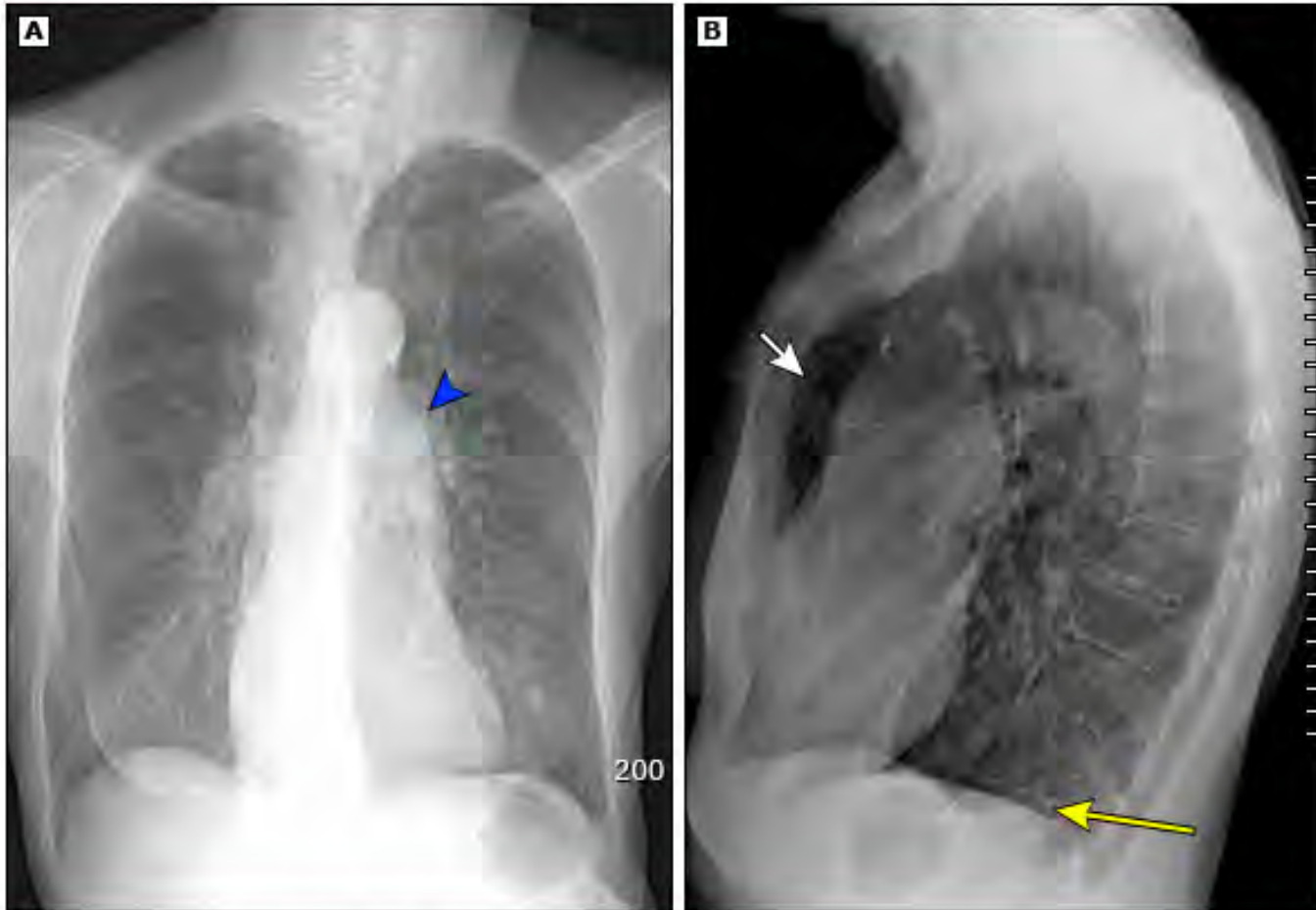
Diagnostic Test

FEV₁/FVC Ratio < 0.7

FIGURE 3. VOLUME-TIME CURVES (before and after bronchodilator)



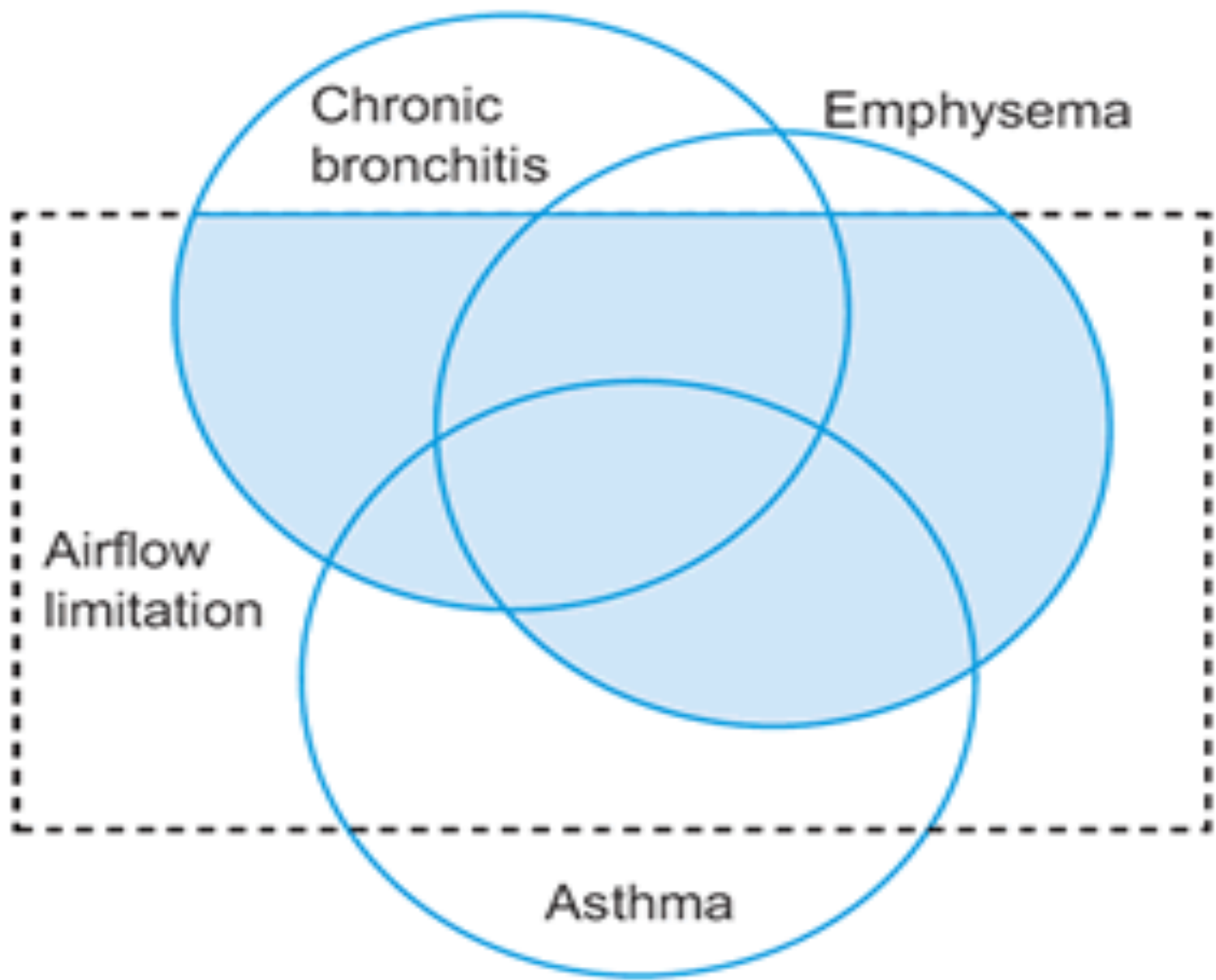
Chest x-ray emphysema



The posteroanterior (A) and lateral (B) chest x-rays of a 71-year-old female with emphysema show increased lung volumes with flattened hemidiaphragms on the lateral examination (long yellow arrow) and increase in the retrosternal space (short white arrow). The normal retrosternal airspace is less than 2.5 cm. A prominent pulmonary artery on the posteroanterior view (blue arrowhead) reflects secondary pulmonary hypertension.

Diagnostic Difficulties in Older Adults

- FEV₁ and FVC reference values are extrapolated from younger adults
- FEV₁ declines with age
- May result in overdiagnosis of obstructive lung disease
- Presence of comorbid medical conditions



Treatment Guidelines

- Patient education:
 - Smoking cessation, inhalation technique, PRN vs. RTC meds, symptom monitoring, end-of-life issues
- Vaccinations: Pneumococcal & Influenza
- Bronchodilators:
 - Short acting inhaled bronchodilators
 - Long acting inhaled bronchodilators
 - Theophylline

Treatment Guidelines

- Inhaled corticosteroids
- Pulmonary rehabilitation
- Oxygen therapy
- Lung volume reduction surgery
- Mucoactive agents: have limited or no value

Short-Acting Inhaled Bronchodilators

- Beta-agonists
 - Albuterol, Levalbuterol, Pirbuterol
- Anticholinergics
 - Ipratropium
- Used for immediate relief of symptoms
- Safe at recommended doses; at higher doses, can cause tremors, tachycardia, $\downarrow K^+$ and worsening of glaucoma & urinary retention (Ipratropium)

Short Acting Inhaled Bronchodilators

Drug	MDI dose	Dosage
Albuterol-HFA	90 mcg/puff	2 puffs q 4-6h prn
Levalbuterol-HFA	45 mcg/puff	1-2 puffs q 4-6h prn
Pirbuterol Autohaler	200 mcg/puff	2 puffs q 4-6h prn
Ipratropium	MDI: 17 mcg/puff	2 puffs qid
Albuterol + Ipratropium	90 mcg + 17 mcg/puff	2 puffs q 4-6h prn

Long-Acting Inhaled Bronchodilators

- Beta-agonists
 - Salmeterol, Formoterol, Arformoterol, Indacaterol
- Anticholinergics
 - Tiotropium
- Combination
 - Umeclidinium + Vilanterol
- Used as maintenance therapy
- Black box warning with LABAs

Long Acting Inhaled Bronchodilators

Drug	DPI dose	Dosage
Salmeterol	50mcg/inhalation	Twice daily
Formoterol	12mcg/inhalation	Twice daily
Arformoterol	15mcg/neb	Twice daily
Indacaterol	75mcg/inhalation	Once daily
Tiotropium	18mcg/inhalation	Once daily
Umeclidinium+ Vilanterol	62.5mcg + 25mcg per inhalation	Once daily

Sustained-Release Theophylline

- Rarely used in older adults
- Inexpensive and available in oral formulation
- Bedtime use may help nocturnal and early morning symptoms
- Narrow therapeutic window and causes frequent side effects & drug interactions
- Monitor drug level (8-12 $\mu\text{g}/\text{mL}$)

Inhaled Steroids

- Used as part of a combined regimen to reduce COPD exacerbations
- Adverse effects include oral thrush, reduced bone mineral density, glaucoma & cataract
- Adverse effects are less severe and fewer than systemic steroids

Other Therapies

- PDE-4 Inhibitors:
 - Roflumilast decreases inflammation & may relax the airway
 - Once a day oral medication
 - May be used to prevent exacerbations
- Chronic Macrolide Therapy:
 - Erythromycin 250mg bid for one year lead to fewer exacerbations in an RCT

You see a 73 YO male with H/O of HTN, DM & COPD (FEV₁ 70% of predicted) who complains of dyspnea and wheezing when walking ½ a city block. His symptoms are relieved with an MDI (Albuterol +Ipratropium). His other medications are Lisinopril and Metformin. There is no h/o COPD exacerbation. What should you do next?

- A. Add a steroid inhaler
- B. Start Prednisone 10mg every other day
- C. Add a long acting inhaled bronchodilator
- D. Prescribe O₂ supplement with activity

How do you choose specific therapy?

- Gold stage
 - 1 or 2
 - 2 or 4
- Severity of symptoms
 - Mild or infrequent
 - Moderate to severe
- Frequency of exacerbation in the last 12 months
 - 0 to 1
 - 2 or more

Severity of Airway Obstruction

Gold Staging

0 At Risk	I Mild	II Moderate	III Severe	IV Very Severe
<ul style="list-style-type: none">•Risk factors•Ch symptoms•Normal spirometry	<ul style="list-style-type: none">•$FEV_1/FVC < 0.7$•$FEV_1 \geq 80\%$•With or without symptoms	<ul style="list-style-type: none">•$FEV_1/FVC < 0.7$•FEV_1 50 to 80%•With or without symptoms	<ul style="list-style-type: none">•$FEV_1/FVC < 0.7$•FEV_1 30 to 50%•With or without symptoms	<ul style="list-style-type: none">•$FEV_1/FVC < 0.7$•$FEV_1 < 30\%$ or $< 50\%$ plus chronic respiratory failure

Modified Medical Research Council (MMRC) dyspnea scale

Grade	Description of breathlessness
0	I only get breathless with strenuous exercise
1	I get short of breath when hurrying on level ground or walking up a slight hill
2	On level ground, I walk slower than people of the same age because of breathlessness, or have to stop for breath when walking at my own pace
3	I stop for breath after walking about 100 yards or after a few minutes on level ground
4	I am too breathless to leave the house or I am breathless when dressing

Adapted from: Fletcher CM, Elmes PC, Fairbairn MB, et al. The significance of respiratory symptoms and the diagnosis of chronic bronchitis in a working population. British Medical Journal 1959; 2:257.

UpToDate®

Therapy based on Gold stage, exacerbation risks & symptoms

Gold Stage	Symptoms	Exacerbations	Therapy
1 or 2	Mild or infrequent	0 to 1 in the last 12 months	Short acting bronchodilator as needed
1 or 2	Moderate to severe	0 to 1 in the last 12 months	<u>Add</u> long acting bronchodilator & pulmonary rehab
3 or 4	Mild or infrequent	2 or more in the last 12 months	<u>Add</u> ICS, use combination inhalers and consider LVRS
3 or 4	Moderate to severe	2 or more in the last 12 months	Various combinations of LABA, LAMA & ICS; consider LVRS
All stages			Smoking cessation, Flu and pneumococcal vaccines, and Oxygen if hypoxemic

Types of Inhalation Device

- 40% are unable to use inhalers properly
 - arthritis, tremors, CVA, visual & cognitive impairment
- Metered Dose Inhaler
 - Use breath actuated inhaler or a spacer
- Soft Mist Inhaler
 - Reduces problems with co-ordination and is propellant free

Inhalation Device (Contd)

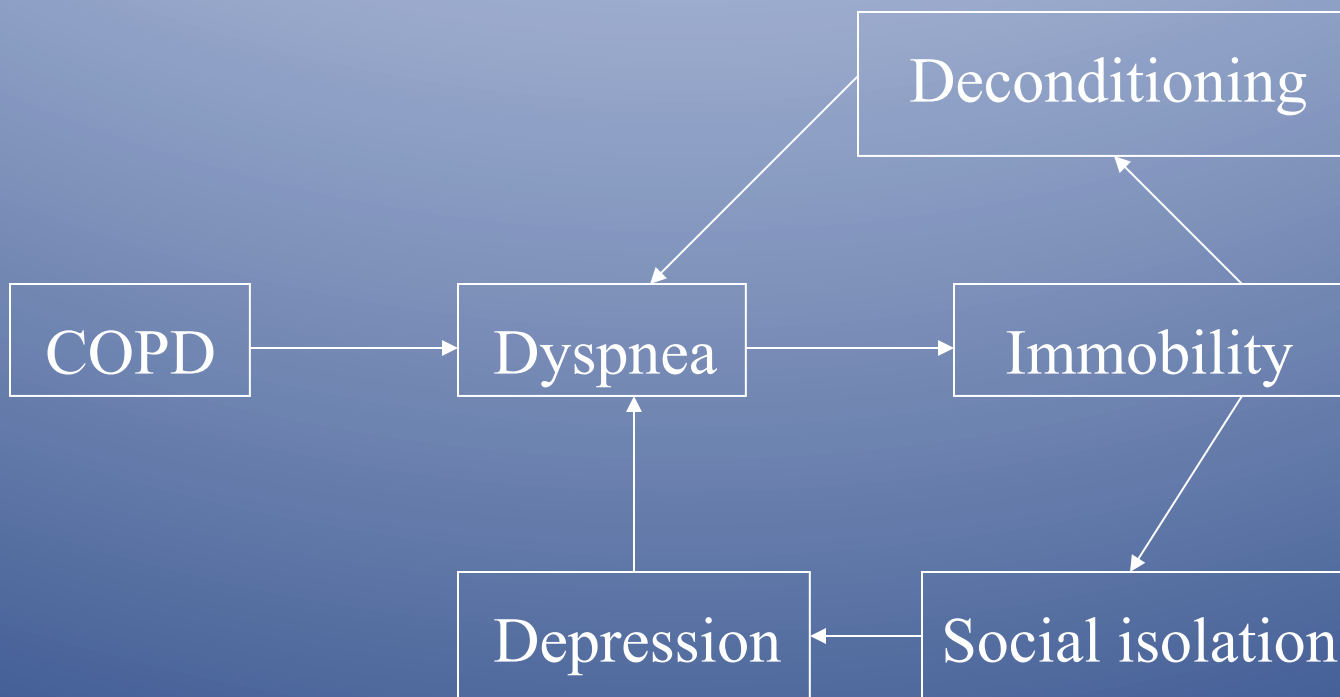
- Dry Powder Inhaler
 - Dispensed as capsules so patient education is important
- Nebulizer
 - With a mouth piece or a face mask
 - Eye deposition of anticholinergics is a concern with the face mask



Global
HD

Pulmonary Rehabilitation

The cycle of physical, social, and psychosocial consequences of COPD



Pulmonary Rehabilitation

- Inpatient, outpatient and home settings
- Four to ten week program - benefits extend beyond the immediate period of training
- Patients with more than mild COPD should be referred

Benefits of Pulmonary Rehabilitation

- Reduces dyspnea & improves exercise capacity
- Improves health-related quality of life
- Reduces hospitalization
- Reduces anxiety and depression associated with COPD

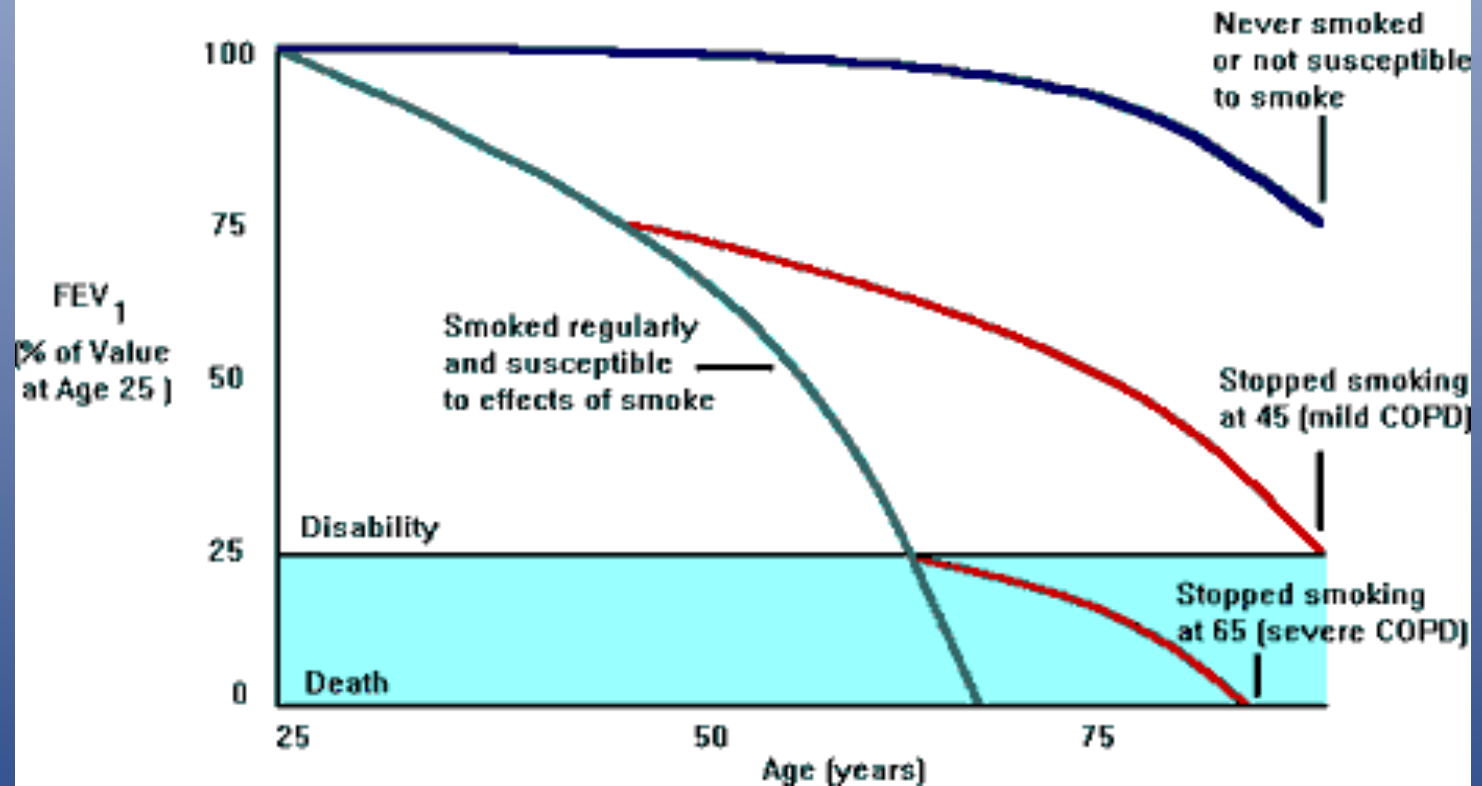
Which of the following interventions has been shown to prolong survival in COPD patients?

- A. Smoking cessation in a patient with moderate COPD
- B. Oxygen therapy in COPD patients with hypoxemia
- C. LVRS in a patient with upper lobe emphysema
- D. All of the above
- E. None of the above

Interventions That Improve Survival in COPD

- Smoking cessation
- Oxygen
- LVRS
- What about inhaled bronchodilators and steroids?
 - TORCH
 - UPLIFT

COPD Risk and Smoking Cessation



Pharmacotherapy for Smoking Cessation

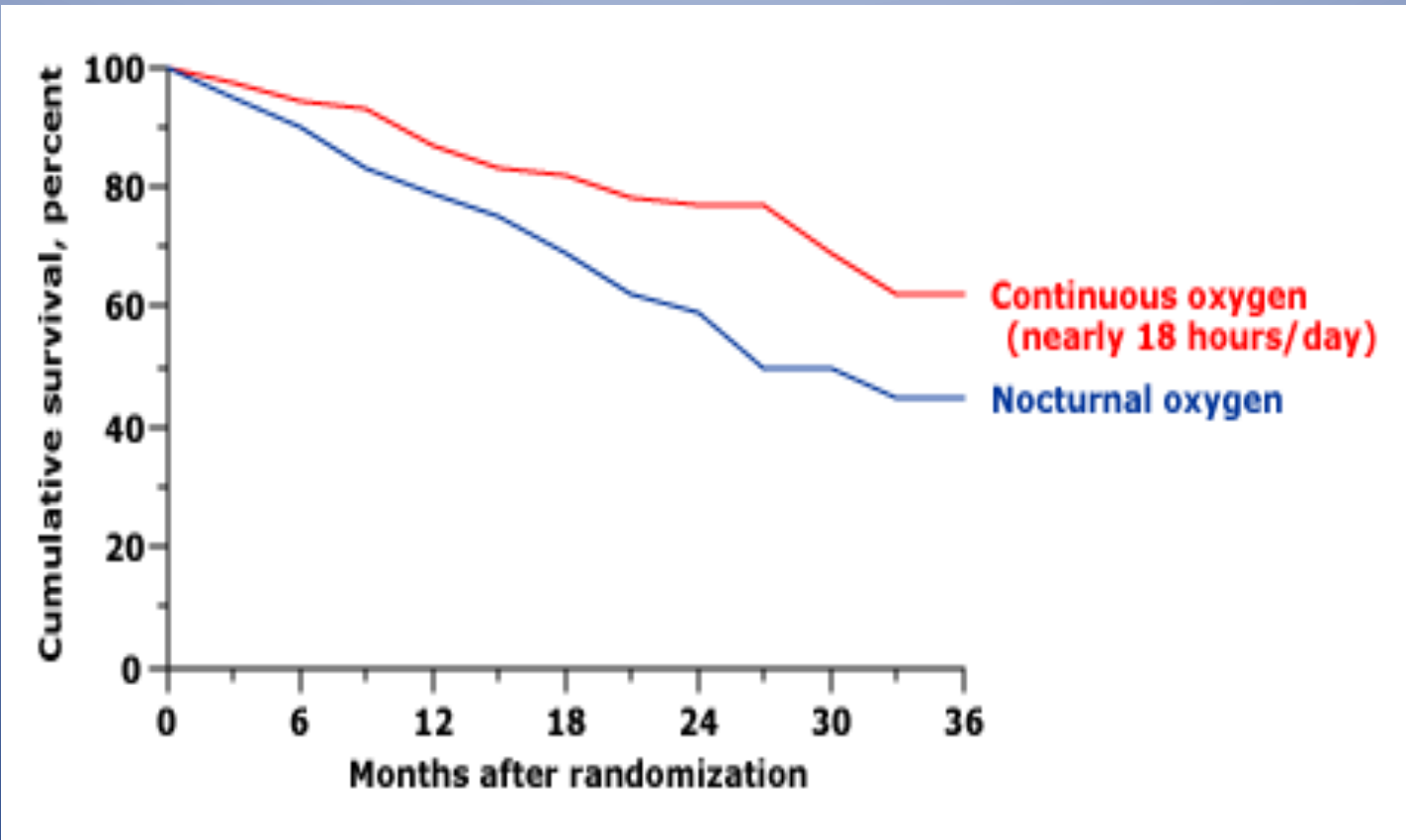
- Nicotine replacement: Available as patch, gum, nasal spray or inhaler
 - After six weeks, taper every two weeks
- Bupropion: May be combined with the patch for greater efficacy
 - Start 2 weeks before and continue for 7 to 12 weeks
- Varenicline (Chantix)
 - 1 mg bid for 12 to 24 weeks; start with 0.5mg daily
 - Recent reports of agitation and suicidal thoughts

Smoking Cessation

Best results of smoking cessation are seen when clinician counseling is combined with pharmacotherapy

Indications for Long Term Oxygen

- $\text{PaO}_2 \leq 55$ mmHg or $\text{SaO}_2 \leq 88\%$
- PaO_2 55 – 59 mmHg or $\text{SaO}_2 \geq 89\%$, if cor pulmonale, right heart failure or hct $> 55\%$
- $\text{PaO}_2 \geq 60$ mmHg or $\text{SaO}_2 > 90\%$, if lung disease or OSA with nocturnal desaturation
- $\text{PaO}_2 \leq 55$ mmHg during sleep or exercise

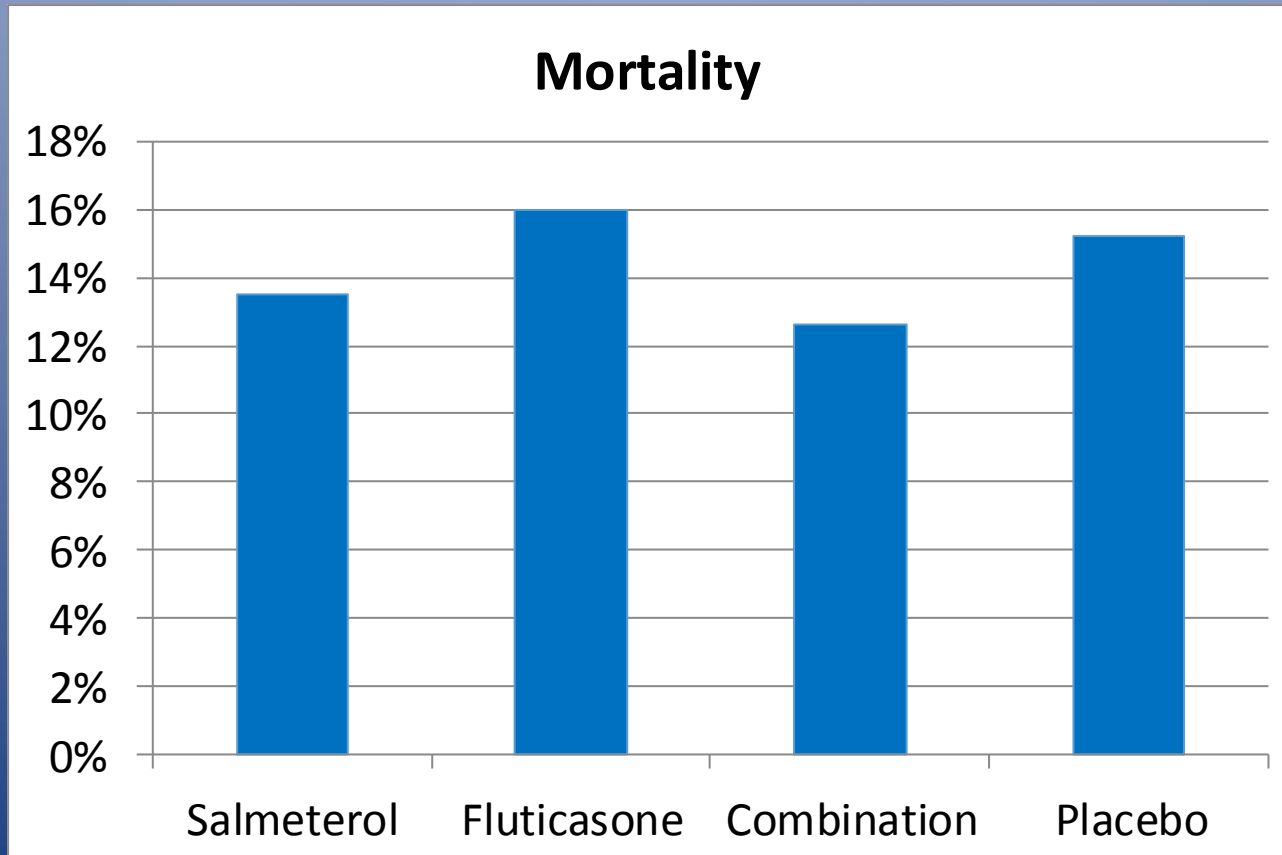


NETT

- RCT compared LVRS to medical treatment
- Showed an improvement in exercise capacity with LVRS
- Those with predominantly upper lobe disease and low exercise capacity had a survival advantage (RR for death, 0.47)

TORCH Trial

3 year RCT involving 6112 patients



UPLIFT Trial

- 4 year RCT compared Tiotropium to placebo
- Tiotropium showed improvements in airflow, rate of COPD exacerbation and HRQOL
- It did not have a significant effect on the rate of decline in FEV_1 or mortality

COPD Exacerbation

Predictors of COPD Exacerbation ECLIPSE Study

- Best predictor was a history of exacerbation during the previous year
- GERD or Heartburn
- Disease severity
- Poorer quality of life
- Elevated WBC

Etiology

- Respiratory infections: 70 to 80%
 - mostly viral & bacterial infections
 - Atypical bacterial infections are a relatively uncommon cause
- Environmental pollution/unknown: 20 to 30%
 - consider myocardial ischemia
 - heart failure
 - Aspiration pulmonary
 - Embolism (prevalence of 20 to 25% in one meta-analysis)

Treatment of COPD Exacerbation

- Albuterol nebulizer (250mcg) or MDI with spacer 4 to 8 puffs (90mcg/puff) every 1 to 4 hours as needed
- Ipratropium nebulizer (500mcg) or MDI with spacer 2 puffs (36mcg) every 4 hours as needed
- Prednisone 30 to 40mg/day for 7 to 10 days (GOLD); optimal dose and duration are not known
- Broad spectrum antibiotics for 7 days if bacterial infection is suspected

COPD Exacerbation (cont'd)

- Oxygen supplementation to achieve a PaO_2 of 60 to 65 mmHg, with O_2 sat > 90%
- Mechanical ventilation – NIPPV/intubation
- Theophylline provides no added benefit
- Mucolytic agents, chest PT with percussion & postural drainage are of little or no value

Adherence To Guidelines In Older Adults with COPD Exacerbation

- Only 63% were on 1st line medications in the 4 weeks preceding their exacerbation
- No anticholinergic agents were given during the 1st hour of emergency department visit
- 38% did not receive systemic steroids
- 72% did not receive antibiotics

BODE Index

- A multidimensional grading system based on
 - BMI
 - Obstruction
 - Dyspnea
 - Exercise capacity
- Better predictor of mortality than FEV₁

BODE Index

Variable	0	1	2	3
FEV ₁ (% predicted)	>65	50-64	36-49	<35
6 min walk distance (m)	>350	250-349	150-249	<149
MMRC dyspnea scale	0-1	2	3	4
Body mass index	>21	<21		

Mortality based on BODE Index

Score	One-year mortality	Two-year mortality	52-month mortality
0-2	2%	6%	19%
3-4	2%	8%	32%
4-6	2%	14%	40%
7-10	5%	31%	80%

Mortality & COPD Exacerbation

- Patients admitted with a PaCO_2 of ≥ 50 have:
 - 33% mortality in 6 months
 - 43% mortality in one year
- Patients requiring mechanical ventilation have approx 25% mortality

Summary

- Age related changes: \downarrow FEV₁, \downarrow PO₂ & \uparrow A-a grad.
- Bronchodilators: Short & long acting inhaled agents
- Steroid inhalers
- Pulmonary Rehabilitation
- Oxygen, if hypoxemic
- LVRS
- Smoking cessation

Quality and Efficiency Care Model

Ken Lund

Welcome to CALTCM!



Ken Lund

CEO, Shea Family

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Disclosure Statement

- I have no relevant financial relationships with a commercial interest to disclose.

Learning Objectives

- Describe key business concepts in Long Term Care
- Describe metrics that drive Long Term Care operations
- Recognize major payment sources and structures for Long Term Care services
- Name operational strategies to meet business objectives

About Shea Family

San Diego, CA

- Home healthcare
- Home Care (ADL's)
- In-home remodeling
- Hospice (*Partnered*)
- Skilled care
- Assisted living
- Transportation
- Meal delivery
- ...And more.



"We're a healthcare logistics company."

A Cautionary Tale...

- What happens when...

Ready or Not...

Managed Care represents a
10% to a 35% cut in
Medicare A rates



What do You Want?

- Mission alignment?
- Values alignment?
- What sacrifices are you willing to make?
- Can you adapt to rapid change or will you fight the future?
- Do you understand the elasticity of your existing model?
- What is the upside?
- What leverage do you have to share in savings?
- Do you have the right partners?

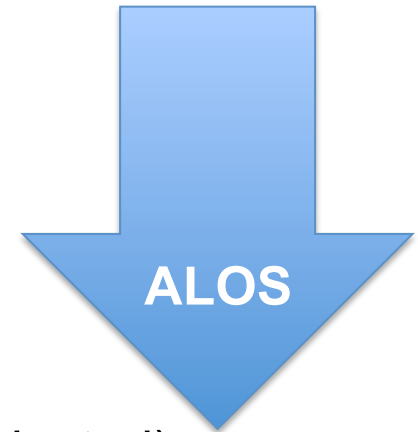
Hospitals, Managed Care, ACOs...

What Do They Want?

- **Partnership**
 - Simplicity narrowed network
 - Value alignment
 - Quality physical plant
 - Breadth of service
 - Transparent state of the art technology
- **Quality Outcomes**
 - Low RTH
 - Short ALOS
 - Elimination of appeals
 - Better than market quality measure
 - “Bragging rights”
- **Risk Transfer**
 - Asset deployment
 - Regulatory risk
 - Legal risk
 - P&L risk
 - Capitated Rate/Bundled Payment
 - Expense control not their problem regarding acuity based staffing

Length of Stay

- 2011 = 28+ ALOS Skilled
- 2012 = 20+ ALOS Skilled
- 2013 = 14-18 ALOS Skilled
- 2014 = 10-12 ALOS Skilled (Projected)



In 2013 every day under budgeted ALOS costs \$50k in revenue per month

Price Versus Volume

2010

Skilled	10%
Custodial	90%

2011

Skilled	30%
Custodial	70%

2012

Skilled	45%
Custodial	55%

2013

Skilled	65%
Custodial	45%

2014

Skilled	75%
Custodial	25%

Offer Value

- Centralized logistics management
- Breadth of service array
- Integrated cutting edge technology
- MD teams on the ground
- Transitions for life
 - At/before acute episode
 - In buildings
 - At times of transition
 - As advisors for the long term
 - Supplemented by call center and technology

Know Your Data

What They Know

- Know your metrics and preemptively share your information
- Own your issues

Power of Your Data

- Understand your capabilities before you contract
- Negotiate ranges not absolute values
- Understand throughput and volume constraints
- Be clear about balance & partnership

Get Costs in Order

- Basic operating costs become exceptionally metrics driven
- Ancillary costs are becoming outcome based (therapy, Rx, supplies) and vendor dependent
- Corporate overhead
- Revenue cycle management



Optimize Physicians

- Level the field
- Team approach
 - CMO
 - Plan MDs, NPs, PAs & Case Managers
- “Congress of Resources”



Contracting Expert

- Honesty, transparency & humility
- Intense focus on building relationships
- Establish performance ranges
- Know what you know (and don't know)
- Drive volume managed to performance metrics
- Use an *EXPERT!*



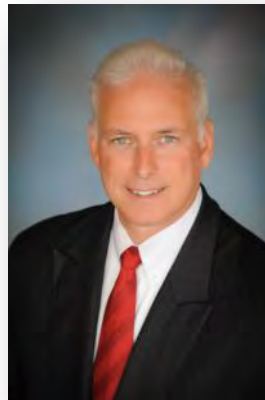
Summary

- Constantly measure your value
- Understand your customer needs
- Understand your needs
- Continuously improve
- Focus on what matters
- Drive costs down & quality up



Got Questions?

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The Green House Model and Outcomes

Individualized Care is Better Care



David Farrell, LNHA, MSW
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The Green House Project

Disclosure Statement

- I have no relevant financial relationships with a commercial interest to disclose.

Learning Objectives

- Gain insights into the evidence-based Green House Model for SNFs
- Understand how new state laws support small-house SNF development
- Appreciate and adapt person-centered care as a treatment paradigm for COPD patients

Nursing Home History

- 1965 - Passage of Medicare/Medicaid
 - Offered a Nursing Facility Benefit
 - Began the rise of “Convalescent Hospitals”
 - “Convalescent Hospitals” designed like hospitals
- Quality of Life concerns
 - 1960’s - “depersonalization” of nursing home life
 - 1970’s - “custodial care”
 - 1980’s - “psychic despair”
 - 1990’s - “loneliness, helplessness and boredom”

Frank, B. 2004

A Broken System

“So many of the systems in traditional settings foster dependence. The systems make people shut down and feel incapable. A normalized environment can liberate them.”

Dr. Al Powers

Dr. Bill Thomas, Geriatrician

- Harvard
- Eden Alternative
- “What Are Old People For?”
- GREEN HOUSE® Model

Green House Transformation

- Shift within current nursing home regulatory and organizational structures
- Transformation:
 - Physical Design: Real Home
 - Organizational Redesign: Empowered Staff
 - Philosophy: Meaningful Life



Real Home



Real Home

- Warm, Smart and Green
- Similar to surrounding community
- Private rooms and baths
- Residential Finishes
- Intentional Community



Real Home

- Home to 10 – 12 elders –
- Small scale, intimate spaces
- Internally organized for public to private progression
- Good sight lines
- Lots of natural light
- Exterior space immediately accessible



“I want to go home.”

“Often when a resident says - “I want to go home” - they are not necessarily referring to the house they came from, but rather to a state of being that was comfortable, ordered, and fundamentally orienting.”

Caulkins, M. 2003

Key Elements: Hearth



Open plan Living, Dining, & Kitchen

Kitchen

- Open access to elders except at busiest times
- Elders can prepare food with supervision
- Built-in safety features allow open kitchen to be part of elder's life

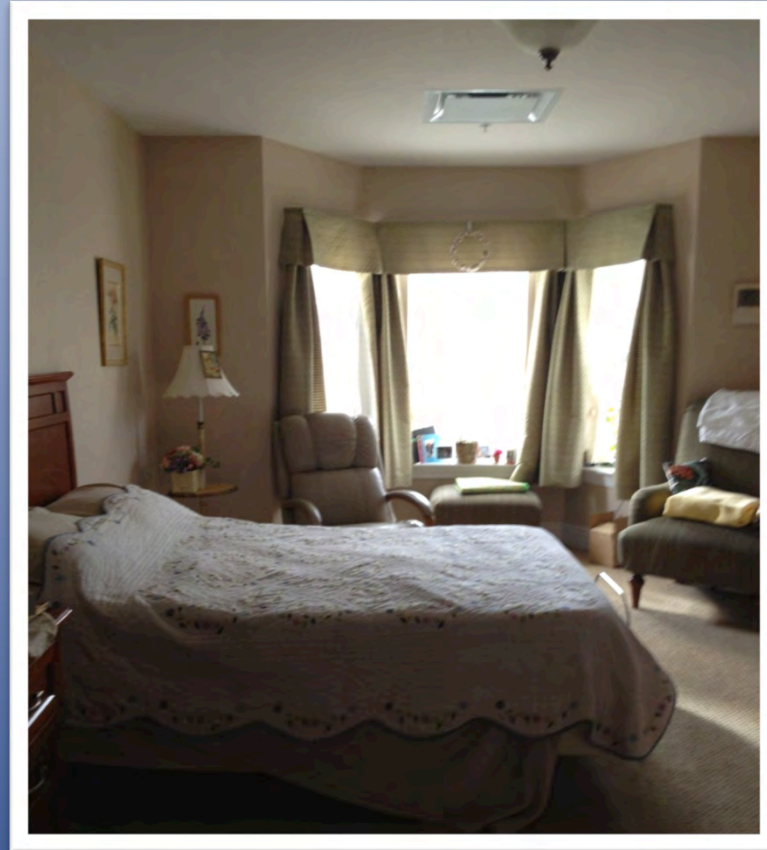


Living Room



Private Bedrooms

- Elders encouraged to bring own furniture
- Provide a sanctuary



Bedroom: 210 NSF

Private Baths



In-Room Medication Cabinets



- Key locked
- Key with nurse
- Refrigerated meds and narcotics locked in office
- All meds prepared in room

Easy Access to Outdoors



Office



- Qualifies as nurses' station
- Paper and electronic charting location
- Open to elders and family

Life & Fire Safety

Meets institutional life safety standard, including:

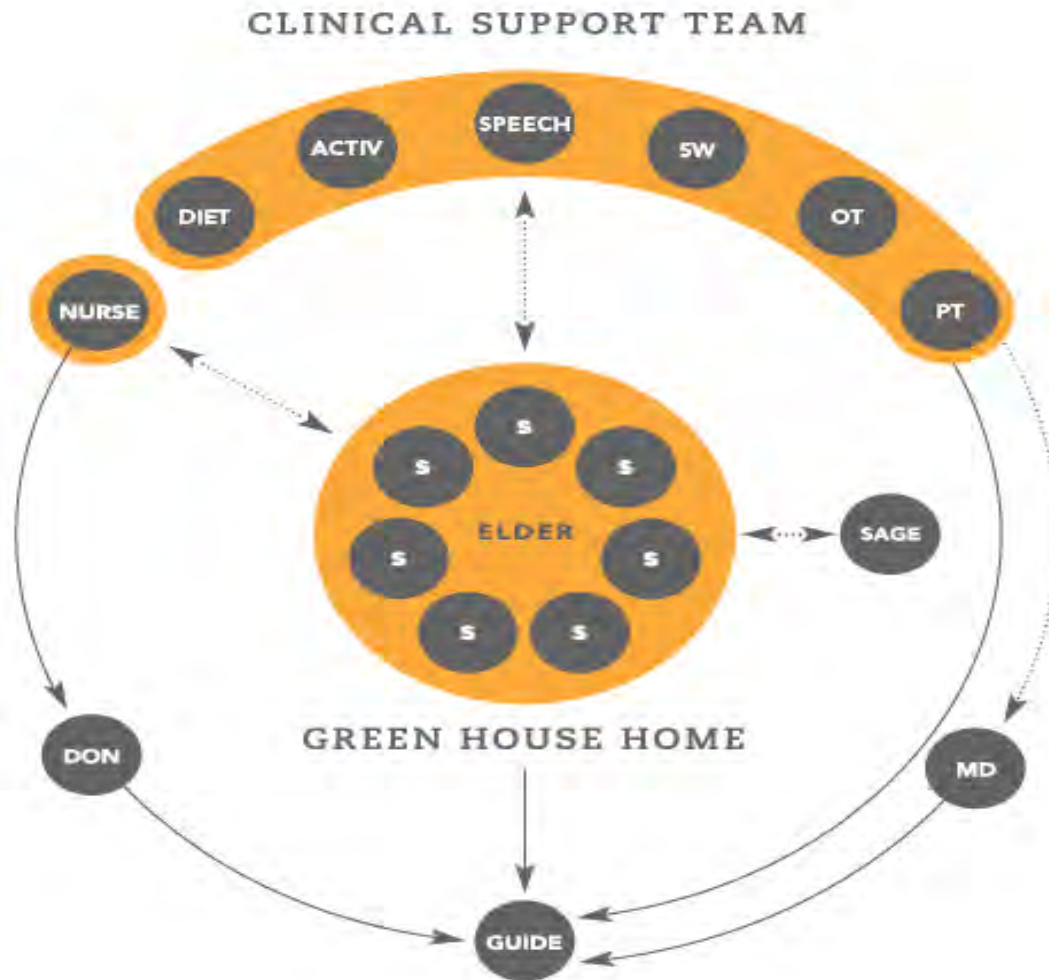
- Automatic Sprinkler System
- Emergency Lighting
- Exit doors/smoke compartments
- Comprehensive staff training
- Generator
- Emergency egress door lock releases



Empowered Staff



Organizational Redesign



Organizational Redesign

- Elder at the heart of the organizational chart
- Shahbazim – versatile worker
 - Prepare meals, housekeeping, laundry
- Additional education hours = 128
- Redefines roles and responsibilities of the direct care worker, nurses and the clinical support team



Training: Shahbaz

- CNA – required as a foundation
- 128 Hours additional training:
 - Safe food handling
 - CPR / First Aid
 - Culinary skills
 - Home maintenance/ management skills
 - 48 hours Green House Training:
 - Dementia care
 - Critical Thinking for Clinical Excellence
 - Communication
 - Teamwork skills
 - Policies & Procedures



Direct Care Staffing – 10 Room Green House

- **Shahbazim**
 - 2 Shahbazim – am shift
 - 2 Shahbazim – pm shift
 - 1 Shahbaz - night shift
 - Total = 4.0 HPPD
- Universal worker role
- Nurses
 - One Nurse per two houses am shift
 - One Nurse per two - three houses pm shift and night shift
 - Total: **.80 – 1.0 HPPD**

Nurses in The Green House Homes

- Care Role Model
- Gerontological Expert
- Care Partner
- Mentor and Teacher



Role of Nursing/Clinical Care

- “...if anything, the nursing care is better [in a Green House home] than in a conventional nursing facility. Things don't get overlooked at a Green House, as they might be in a nursing home, where caregivers don't work so closely with each other. If an elder stumbles at a Green House, every caregiver knows it and starts watching that person”

(Barbara Bowers, Associate Dean for Research, School for Nursing, University of Wisconsin, Dallas Morning News, 2/3/09).

Meaningful Life



Work Flow Study

Transport: .77 hours less transportation time per elder per day in GH homes

Waiting for Meals: 1.1 hours less waiting time for meals per elder per day in GH homes & more interaction in GH homes while waiting

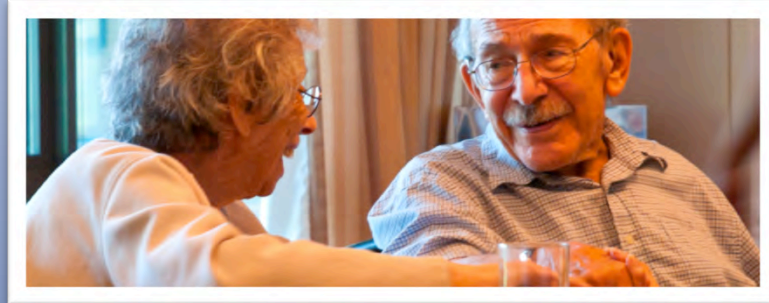
Breakfast Flexibility: 1.3 hours longer breakfast period in GH homes (1 hour vs. 2.3 hours)

Direct Engagement: Over 4 times as much direct engagement in GH homes vs.. traditional per elder per day (23.5 mins. vs. 5.2 mins.)



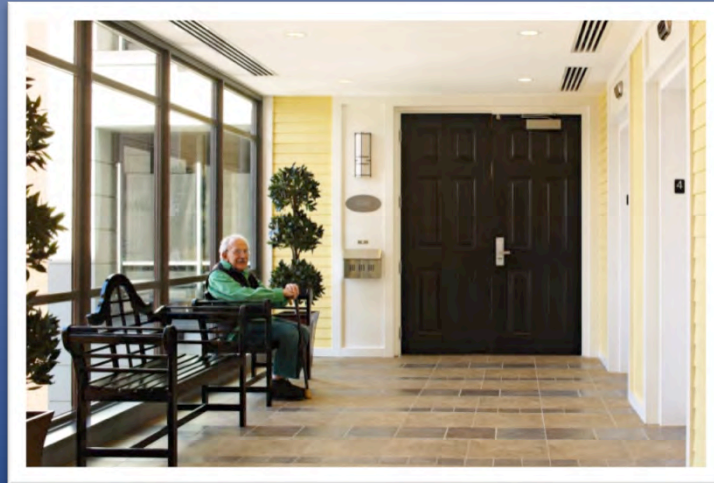
Living, Growing, Thriving

- Structure decision-making with elders
- Facilitate deep knowing
- Support a life worth living: engagement, enjoyment, purpose



Meaningful Life

- Resident participation and input in all aspects of care
- No Schedules -
 - Breakfast cooked to order and served all morning
 - Residents wake up as they please
 - No classic across-the-board staffing pattern



Leonard Florence Center for Living

Urban Green House



Short-Term Rehab in GH Homes

A real home is the best place to rehab and get back home:

- Home layout
- Medication management
- Private rooms with private bathrooms
- Home cooked meals
- Access to fresh air and sunlight
- Rehab in a real home
- Lower ratios and consistent assignment

Short-Term Rehab in GH Homes Outcomes

Leonard Florence Center for Living –

- *Length of stay – 19.2 days vs. 28 days nationwide*
- *Re-hospitalization rate – 9.6% vs. 18.5% nationwide*

Satisfaction & Clinical Research

Kane: JAGS 2007 – Satisfaction and Clinical

- Significant improvements in satisfaction
- Better clinical outcomes

Sharkey: JAGS 2011 – Staff Time and Clinical

- Acuity the same between settings
- Fewer total hours in GH homes
- Better clinical outcomes
- 4 times more engagement between staff and elders

Grabowsky: Working Paper – Medicare and Medicaid

- Slower late loss ADLs
- Lower rehospitalization rate

Bowers: Working Paper – Nursing Quality

- Seamless communications and deep relationships
- Nursing care as good or better than traditional



NIC Article - Financial Benefits

- Occupancy increases:
 - GH homes average 96%
 - National average 85% and falling
- Private pay occupancy increases:
 - GH homes increased private pay days by 24%
 - Nationally, NHs lost 8% private pay days in same period
- Private pay rates increase with private rooms
- Short-term Medicare, HMO occupancy increases with all private rooms

NIC, 2011

Case Study – Re-Position and Gain Market Share

Before -

- 120 bed SNF, 60 semi-private rooms

After -

- 3 Green House homes of 12 people
- Move 36 residents to Green Houses
- Convert 36 rooms to private in current SNF
- Total 72 private rooms and 24 semi-private rooms
- Less congestion in older SNF
- Re-purpose space



5-Star Nursing Home Rating System



**83% of Green House
Homes are 4 or 5
Stars compared to
47% of nursing
homes nationwide!**

Other Innovations

- Repositioning CCRC
- Assisted Living
- Dementia Care
- PACE



Spread

Operating

- 153 homes
- On 36 campuses
- In 24 states

In Development

- 120 homes
- On 19 campuses
- In 9 additional states



Market Response



**THE WALL
STREET
JOURNAL**

*Rising Challenger
Takes on Elder-Care
System*



Provider

*Culture Change Goes
Mainstream - Green House
Homes, Considered the
Pinnacle of the Movement,
Spread to 26 States*



AARPSM

*Green House' Homes:
A Model for Aging
That Promotes Growth*



PARADE

*Where We Live As We
Age*



n p r

*Reformers Seek To
Reinvent Nursing Homes*



The New York Times



SmartMoney.com

*Home Sweet (Rest)
Home*



**The
Philadelphia
Inquirer**

*A Healthier Take on
a Nursing Home*



Kiplinger

*A Nursing Home You
Can Call Home*

Barriers to Faster Replication

- **Regulations – our surveyors won't allow it**
- **Economics – operating costs, access to capital, covering the debt**
- **Model is too prescriptive – too many specific requirements**
- **Union – would not accept new job descriptions**

Green House Technical Assistance

- Project management
- Financial feasibility
- Design
- Regulatory navigation
- Fundraising and financing
- Operational planning
- Staff education
- Leadership development
- PR and marketing



Delivering GH to Inner-Cities

- Critical Access Nursing Homes (CANH)
- Variables associated with closure
 - Urban zip codes
 - Serving minorities
 - Pockets of concentrated poverty
 - High dual-eligible/Medicaid population

Mor, V., 2011

Social Impact Investors

- Capital Impact Partners
- AARP PRI
- RWJF PRI
- Calvert Foundation
- Weinberg Foundation
- CHCF

- Pre-development loans
- Construction loans
- Gap financing

Eligibility

- Green House Model adopter – for-profit is OK
- Commitment to care for 40% - 60% dual-eligible's
- Promote mixed-use business plans -
 - increase access – dialysis center, HH office
 - reduce transportation costs and disparities
- Combine projects where it is needed – GH homes on top of a charter school or below affordable housing; GH homes on top of a new grocery store

Ensuring the Social Impact: General Eligibility

- Green House Model adopter – for-profit is OK
- Commitment to care for 40% - 60% dual-eligible's
- Promote mixed-use business plans -
 - increase access – dialysis center, V to V office
 - reduce transportation costs and disparities
- Combine projects where it is needed – GH homes on top of a charter school or below affordable housing; GH homes on top of a new grocery store

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Action Planning Session

COPD

Disclosures

Dr. Steinberg has received honoraria for being on the non-branded speakers bureau for Boehringer Ingelheim.

No other faculty or planners have any relevant financial relationships with a commercial interest to disclose.

Activity planners have resolved the potential conflict of interest and determined the presentation is without bias.

Learning Objectives

- Decide on a measureable objective for improving COPD care
- Identify the core members at your facility who will Champion and Co-champion this quality improvement project
- Decide what care processes you will initially address
- Establish a timeline for completion of the initial intervention
- List the top 3 barriers you will need to address to move forward with this quality improvement initiative

Q & A Panel

COPD

Shawkat Dhanani, MD, MPH; David J.
Farrell, MSW, LNHA;
Timothy Gieseke, MD, CMD;
Ken Lund;
Jennifer Wieckowski, MSG

Disclosures

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No other faculty or planners have any relevant financial relationships with a commercial interest to disclose.

Activity planners have resolved the potential conflict of interest and determined the presentation is without bias.

Learning Objectives

- Determine age associated changes in clinically important pulmonary physiology
- Choose appropriate treatment of stable COPD for each stage of the disease
- Differentiate between symptomatic treatment and life prolonging interventions in COPD
- Determine the appropriate management of COPD exacerbation
- Estimate prognosis in COPD patients



JAMDA

journal homepage: www.jamda.com

Editorial

Chronic Obstructive Pulmonary Disease: A Disease of Older Persons

John E. Morley MB, BCh *

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Numerous physiological changes in lung function occur with aging. These include a decline in forced expiratory volume (FEV1), an increase in residual volume, ventilation-perfusion mismatch, diminished respiratory muscle strength and less effective ciliary muscle strength. These changes place the older person at increased risk of mortality from chronic obstructive pulmonary disease (COPD). COPD occurs in approximately 15% of older persons and is the third most common cause of death.¹ Older persons with COPD have a number of unique complications including osteoporosis and hip fracture, sarcopenia, cognitive impairment, male hypogonadism, malnutrition, and decreased awareness of hypoxia. Over one-half of older persons with COPD are frail,^{2–6} and the presence of frailty increases mortality substantially in older persons with COPD.⁷ COPD is a common cause of disability⁸ and a major cause of 30 day readmission after discharge from hospital.^{9,10}

A hospital discharge coordinator intervention has been shown to reduce COPD hospitalizations.¹⁰ It has been suggested that many hospital admissions could be avoided by direct admissions to subacute (nursing home) care¹¹ or by increasing the acuity of home-based primary care.^{12,13} Support of family caregivers is also important in this regard.¹⁴

Modern diagnosis of COPD is made using the Global Initiative for Obstructive Lung Disease criteria, which are objectively based on spirometry. These require a FEV1 of less than 80% if predicted and a postbronchodilator FEV1/forced vital capacity of less than 70% of predicted.¹ Cognitive dysfunction may limit the ability of older persons to meet these criteria. COPD diagnosis is missed in up to 80% of older persons.¹⁵ Zarowitz et al¹⁶ suggested that in nursing homes persons with a diagnosis of asthma, shortness of breath at rest, or on exertion and smoking 19 or more pack years are highly likely to have COPD. A 6-minute walk distance of approximately less than 350 meters is highly predictive of exacerbation and death in persons with COPD.¹⁷

COPD is a major cause of undernutrition in older persons.^{18–20} Many persons with COPD have early satiety as the thermic energy of eating results in hypoxia leading to severe dyspnea during the meal. Food intake can be improved by providing multiple small meals (6 or more) during the day or caloric/protein supplements between meals.^{21,22}

All persons with COPD should be screened for anorexia using the Simplified Nutrition Assessment Questionnaire.^{23,24} Weekes et al²⁵

found that dietary counseling increased weight and reduced dyspnea over a 6-month period.

Sarcopenia is now defined as a decrease in walking distance or speed coupled with a marked decrease in muscle mass.^{26–32} A simple screening questionnaire (SARC-F) is available.³²

Poor caloric intake, muscle hypoxia, generalized inflammation, male hypogonadism, and inactivity all place the person with COPD at increased risk of developing sarcopenia.^{33,34} Many persons with COPD also have diabetes mellitus, which further aggravates loss of muscle function.^{35–39} Sarcopenia leads to an increase in mortality in nursing home residents.⁴⁰ The Interdisciplinary Community-based COPD Management program (INTERCOM) study found that nutritional therapy in combination with exercise improved muscle power and 6-minute walking distance and reduced hospitalizations.⁴¹ Recent studies have shown that protein supplementation improves muscle mass and function.^{42,43}

In this issue of *the Journal*, Cleutgens et al,⁴⁴ using a neuropsychological test battery found that older persons with COPD perform significantly worse on cognitive functioning tests than persons without COPD. This poor performance is, in part, related to airway obstruction. A study from the Mayo Clinic suggested that mild cognitive impairment was twice as common in persons with COPD.⁴⁵ Persons with COPD and cognitive impairment are at higher risk of respiratory-related hospitalizations.⁴⁶ Depression is also a common problem in persons with COPD and is associated with increased mortality.^{47–49}

Persons with cognitive impairment have been shown to have problems using metered-dose inhalers and dry powder inhalers.⁵⁰ These nursing home residents need more intensive supervision. Recently, we stressed the importance of carefully investigating persons with mild cognitive impairment for reversible causes and also instituting an exercise program and shifting their diet to a Mediterranean diet.^{51,52} There is some evidence that cognitive behavioral strategies can improve dyspnea and reduce distress in COPD.⁵³ Use of cognitive stimulus therapy may further enhance memory and function in persons with COPD related memory impairment.⁵⁴

Polypharmacy is a major problem in older persons, and because of the multiple drugs often necessary to control symptoms in COPD, it is a particular problem.^{55–60} The effectiveness of all drugs used in residents needs to be carefully evaluated.⁶¹ Potential side effects of the drugs needs to be regularly considered. For example, Addison's disease may be secondary to inhaled corticosteroids.^{62,63} The potential effect of anticholinergics on cognitive function needs to be monitored. There is no logical reason to give cholinesterase inhibitors to persons requiring anticholinergics to maintain their lung function.

The author declares no conflicts of interest.

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Table 1

Components of an Integrated Disease Management Program for COPD in Nursing Home Residents

1. Smoking cessation
2. Vaccinations (Influenza and pneumococcal)
3. Appropriate symptom documentation (eg, clinical COPD questionnaire)
4. Symptom guided pharmacological therapy
5. Exercise therapy
6. Nutrition therapy including high protein supplements between meals
7. Regular drug use review by pharmacist
8. Manage osteoporosis (evening calcium, vitamin D, and bisphosphonates)
9. Treatment of dysphagia (positioning, speech therapy, ACE inhibitor)
10. Assess and treat for mild cognitive impairment, depression, and anxiety
11. Long-term oxygen therapy where indicated
12. Yearly spirometry and pulmonary consult

ACE, angiotensin-converting-enzyme; COPD, chronic obstructive pulmonary disease.

Osteoporosis occurs in 21% to 59% of persons with COPD.⁶² Vertebral fractures are present in 29% to 63%. Rib case fractures can commonly limit breathing. There is an increase of hip fractures in persons with COPD,⁶⁴ and mortality is greater following a hip fracture in persons with COPD.⁶⁵ Persons with COPD and a body mass index of 25 kg/m² are at particular risk for fractures.⁶⁶ Persons with osteoporosis and COPD should receive evening calcium, 1000 IU of vitamin D daily and a bisphosphonate.^{67–69} Fall risks need to be evaluated and treated.^{70–77} Persons with COPD who fall need to be carefully evaluated for syncope with associated arrhythmias.⁷⁸ Atrial fibrillation is particularly common in persons with COPD.⁷⁹

Dysphagia has been shown to cause exacerbations in persons with COPD.^{80,81} For this reason, persons with COPD need careful attention to posture while eating, speech therapy, and possibly angiotensin-converting enzyme inhibitors.⁸²

Integrated disease management for COPD has been shown to improve quality of life, exercise capacity, and reduce hospital admissions and hospital days per admission.⁸⁶ The components of this approach are shown in Table 1. Smoking cessation represents the primary approach.⁸³ All persons with COPD should be vaccinated against influenza and pneumococcal pneumonia.^{84–89} Appropriate pharmacologic therapy should be guided by symptoms and the resident's response to therapy. Rehabilitation and regular exercise therapy should be available to all persons with COPD. Sinusitis and sleep apnea should be aggressively treated. Oxygen therapy should be utilized to maintain saturation between 88% and 92%. Treatment should focus on allowing the resident to maintain activities of daily living and carry out social activities.⁹⁰ If the activities person finds the resident cannot carry out meaningful activities (eg, because dyspnea limits talking), this should be reported to the primary physician and the pulmonary specialist.⁹¹ Major symptoms experienced by the resident (eg, breathlessness, phlegm, coughing, wheezing, and chest tightness) should be recorded by the nursing staff. A variety of COPD wellness tools are available, such as the clinical COPD questionnaire, which can be easily used by nursing staff.

Overall, nursing home residents with COPD represent a major, time consuming, problem for physicians, nurses, activity directors, and rehabilitation aides.

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Original Study

Cognitive Functioning in Obstructive Lung Disease: Results from the United Kingdom Biobank

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A B S T R A C T

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Objectives: To compare domains of cognitive functioning between persons with and without obstructive lung disease (OLD) and to analyze the relationship between cognitive functioning and the degree of airflow limitation.

Design: An observational population-based study.

Setting: This research was conducted using the United Kingdom Biobank Resource.

Participants: The study population consisted of 43,039 persons with complete data on cognitive functioning and spirometry.

Measurements: Cognitive functioning was compared between persons with and without OLD using linear regression analysis. The relationship between impairment in lung function and cognitive impairment was assessed among persons with OLD.

Results: Persons with OLD had significantly worse scores than persons without OLD on prospective memory [$\beta = -0.15$ (-0.22 to -0.09)], visuospatial memory [β round 1 = 0.06 (0.03 – 0.10)]; β round 2 = 0.09 (<0.001 – 0.18)], numeric short-term memory [$\beta = -0.05$ (-0.10 to <0.001)] and cognitive processing speed [$\beta = 4.62$ (1.25 – 8.01)] after correction for possible confounders. Impairment in prospective memory [$\beta = 0.004$ (<0.001 – 0.01)] and numeric short-term memory [$\beta = 0.01$ (0.003 – 0.01)] were weakly related to FEV₁ (adjusted $P < .05$).

Conclusions: Persons with OLD experience cognitive impairment in different domains, which is partially related to airway obstruction. In particular, memory and information processing are affected. Further assessment of the relationship with patient-related outcomes is needed to optimize patient-oriented treatment.

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Chronic obstructive pulmonary disease (COPD) is a major public health problem. Up to 600 million people are affected worldwide and COPD is one of the leading causes of mortality.¹ COPD is characterized by progressive and largely irreversible airflow limitation resulting in dyspnea. Extrapulmonary features such as fatigue, osteoporosis, cardiac failure, and depression are highly prevalent.²

Patients with COPD can have cognitive impairments, either globally or in single cognitive domains.³ Reported incidence ranges from

12% to 88%.⁴ Cognitive impairment may be associated with the degree of lung function impairment in patients with COPD⁵ and has been found to predict mortality in hypoxemic COPD.⁶ Moreover, cognitive impairment may lead to increased dyspnea and fatigue⁷ and result in incorrect use of inhaler devices and low compliance with medical treatment as has previously been shown in elderly subjects.⁸ This might increase the exacerbation risk and could result in worse health outcome.⁹ To date it remains unknown which domains of cognitive functioning are affected in community-based patients with COPD.¹⁰

Insight in cognitive functioning is of great importance to optimize self-management programs for patients with COPD. Indeed, for a patient with COPD, it is important to comply with guidelines for a healthier life style (eg, quit smoking, correct use of medication, and become physically active). Executive functions are evoked for adequate self-management.¹¹ The domain executive functioning is a

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multifaceted neuropsychological construct, consisting of a set of higher-order neurocognitive processes that contribute to purposeful, goal-directed, and future-oriented behavioral skills, such as organization, planning, problem solving, and reasoning.¹² Patients with executive function deficits have difficulties in managing their disease.¹¹ Consequently, cognitive impairments in COPD patients may negatively affect their treatment and in particular the impact of self-management programs.

The aims of the present study were to compare different domains of cognitive functioning between persons in the general population with and without obstructive lung disease (OLD) and to analyze the relationship between cognitive functioning and the degree of airflow limitation. A priori, we hypothesized that persons with OLD have worse scores on cognitive function tests than persons without OLD. Moreover, we hypothesized that the degree of airflow limitation is related with the degree of cognitive impairment in persons with OLD.

Methods

Design

This observational population-based study has been conducted using the United Kingdom (UK) Biobank Resource, which is a large prospective study in the UK investigating the role of genetic factors, environmental exposures, and lifestyle in major diseases of late and middle age. Details of the rationale and design of this prospective study have been published elsewhere.¹³

Study Population

The UK Biobank study population consisted of 502,682 persons between ages 40 and 70 years from the UK general population. They were recruited in 22 centers in Scotland, England, and Wales, and data were collected from 2006 to 2010. All persons provided written informed consent. In the present study, 43,039 persons with complete data on cognitive functioning and spirometry were included. Persons with a fixed ratio of forced expiratory volume in the first second (FEV₁)/forced vital capacity (FVC) < 0.70 are classified as persons with OLD.² OLD is described as a category of respiratory diseases characterized by airway obstruction, including COPD, chronic bronchitis, emphysema, asthma, bronchiectasis, upper airway lesions, bronchiolar diseases, and some interstitial lung diseases.¹⁴ The control group consisted of persons with a FEV₁/FVC ≥ 0.70.

Outcomes

The following outcomes were recorded: demographic characteristics (eg, age, race, education, employment); height; medical history; lifestyle and environment (eg, smoking habits, sleep, and alcohol intake); and psychosocial factors (eg, depressed mood). FEV₁ and FVC were measured using spirometry (Vitalograph Pneumotrac 6800; Maids Moreton, Buckingham, UK). The largest FVC and the largest FEV₁ were used after examining the data from all of the usable curves to calculate the Tiffeneau index (FEV₁/FVC) and FEV₁% predicted.^{15,16}

Five cognitive functioning tests were performed using a touch screen system: (1) the prospective memory test assesses prospective memory, which refers to the ability to carry out future intentions at a specific time or in response to a specific event; (2) the fluid intelligence test assesses fluid cognitive functioning, which reflects the capacity to solve problems that require logic and reasoning ability, independent of acquired knowledge; (3) the pairs matching test assesses visual spatial ability and reflects the capacity to understand and remember the spatial relations among objects; (4) the numeric memory test is used to measure numeric short-term memory and

assesses the ability to recollect a series of digits; the length of the longest list a person can remember is called the digit span of this person; and (5) the reaction time test gives an indirect index of the cognitive processing speed of a participant. For detailed information, see [Supplementary Data](#). These tests have been developed and refined through piloting to ensure that they provide wide response distributions. They are easily repeatable within a larger cognitive screening battery and have associations with future cognitive decline.¹³

Statistics

Analysis included descriptive statistics using frequencies for categorical variables, and means and standard deviations or medians and interquartile ranges for continuous variables, depending on the variable distribution. Comparison of continuous variables among persons with OLD (FEV₁/FVC < 0.70)² and persons without OLD (FEV₁/FVC ≥ 0.70) were done using unpaired *t*-tests or Mann–Whitney U tests, as appropriate. Categorical variables were compared among persons with OLD and persons without OLD using χ^2 tests. Linear regression analysis with robust standard errors was used to compare cognitive functioning between persons with OLD and persons without OLD, after correction for the following possible confounders: sex, age, race, education, employment, current tobacco smoking, alcohol intake, vascular/heart problems, diabetes, and depressed mood in the last 2 weeks (see [Supplementary Data](#)). Logistic regression analysis was used to compare prospective memory after correction for these confounders. Furthermore, the relationship between lung function and functioning on the different cognitive tests was analyzed by using a Pearson's correlation coefficient or Spearman's rank correlation coefficient, depending on the variable distribution. In addition, we used linear regression analysis with robust standard errors or logistic regression analysis, as appropriate, to adjust for the aforementioned possible confounders. Finally, cognitive functioning of persons with OLD with mild airflow limitation (FEV₁ ≥ 80% predicted), moderate airflow limitation (FEV₁ 50%–80% predicted) and persons with severe or very severe airflow limitation (FEV₁ < 50% predicted)² was compared using linear regression analysis with robust standard errors or logistic regression analysis as appropriate, while adjusting for the aforementioned possible confounders. Statistics were performed using SPSS 17.0 (SPSS Inc, Chicago, IL). STATA 11.1 (StataCorp LP, College Station, TX) was used for regression analysis. A priori, a 2-sided level of significance was set at *P* ≤ .05.

Results

General Characteristics of Participants

In total, 43,039 persons were included. Of these, 5764 persons (13.4%) had a fixed ratio of FEV₁/FVC < 0.70 and were classified as persons with OLD. Generally, persons with OLD were older, more often male, more often current smokers, reported less frequently a college or university degree, and were less likely to be employed than persons without OLD. Persons with OLD had more often comorbidities such as cardiovascular problems, blood clotting, deep vein thrombosis, bronchitis, emphysema, asthma, rhinitis, eczema, allergies, or cancer ([Table 1](#)).

Prospective Memory

Univariate analysis suggested that persons with OLD had lower (worse) scores on prospective memory ([Table 2](#)). This was confirmed by linear regression analysis. After adjustment for possible confounders, prospective memory scores were worse for persons with OLD [$\beta = -0.15$ (−0.22 to −0.09)] ([Table 2](#) and [Supplementary Table 1](#)).

Table 1
Demographic and Clinical Characteristics

	Persons with OLD (n = 5764)	Persons without OLD (n = 37,275)	P Value
Demographics			
Age (y), mean (SD)	59.0 (7.6)	56.0 (8.3)	<.005
Male, n (%)	3145 (54.6%)	16,329 (43.8%)	<.005
Height (cm), mean (SD)	170.3 (9.6)	168.5 (9.2)	<.005
Caucasian, n (%)	5456 (94.7%)	35,393 (95.0%)	.360
Paid or self-employment, n (%)	2765 (48.0%)	22,073 (59.2%)	<.005
College or university degree, n (%)	1687 (29.3%)	12,061 (32.4%)	<.005
Spirometry			
FEV ₁ (L), mean (SD)	2.4 (0.8)	2.9 (0.8)	<.005
FEV ₁ /FVC, mean (SD)*	64.0 (6.5)	78.2 (4.3)	<.005
FEV ₁ (% predicted), mean (SD)	84.3 (19.2)	103.2 (16.3)	<.005
FVC (liters), mean (SD)	3.81 (1.1)	3.77 (1.0)	.009
Smoking status and alcohol consumption			
Current tobacco smoker, n (%)	1077 (18.7%)	3087 (8.3%)	<.005
Number of daily smoked cigarettes in current smokers, mean (SD)* [†]	16.8 (8.3)	14.6 (8.1)	<.005
Number of currently cigars and pipes smoked daily in current smokers, mean (SD)* [‡]	17.3 (11.4)	16.1 (9.2)	.807
Alcohol intake (yes), n (%)	5304 (92.0%)	34,621 (92.9%)	.020
Comorbidities			
Vascular/heart problems diagnosed by doctor, n (%)	1859 (32.3%)	10,511 (28.8%)	<.005
Blood clot, DVT, bronchitis, emphysema, asthma, rhinitis, eczema, allergy diagnosed by doctor, n (%)	2389 (41.4%)	11,129 (29.9%)	<.005
Diabetes diagnosed by doctor, n (%)	272 (4.7%)	1749 (4.7%)	.955
Cancer diagnosed by doctor, n (%)	503 (8.7%)	2738 (7.3%)	<.005
Depressed mood in last 2 wk, n (%)	1373 (23.8%)	8568 (23.0%)	.167
Sleeplessness/insomnia, n (%)	4347 (75.4%)	28,286 (75.9%)	.450

DVT, deep vein thrombosis; FEV₁, forced expiratory volume in the first second; FVC, forced vital capacity; OLD, obstructive lung disease; SD, standard deviation.

*Nonparametric statistical tests have been used because of skewed data.

[†]OLD: n = 841, non-OLD: n = 2031.

[‡]OLD: n = 48, non-OLD: n = 96.

Fluid Cognitive Functioning

Univariate analysis also suggested that persons with OLD had lower scores on fluid cognitive functioning. They had a lower number of correct answers given within the allotted 2-minute limit (Table 2). This was not confirmed by linear regression analysis (Supplementary Table 2). After adjustment for possible confounders, fluid cognitive functioning scores were comparable for persons with and without OLD [$\beta = -0.05$ (-0.11 to 0.003)] (Table 2 and Supplementary Table 2).

Visuospatial Memory

Persons with OLD had lower scores on visuospatial memory. They needed more attempts to touch as many pairs in both rounds with 3 and 6 pairs of cards (Table 2). This was confirmed by linear regression analysis. After adjustment for possible confounders, visuospatial memory

scores were lower for persons with OLD [round 1, $\beta = 0.06$ (0.03–0.10); round 2, $\beta = 0.09$ (<0.01–0.18)] (Table 2 and Supplementary Table 3).

Numeric Short-Term Memory

Univariate analysis suggested that persons with OLD had lower scores on numeric short-term memory, and this was confirmed by linear regression analysis (Table 2). After adjustment for confounders, numeric short-term memory scores were worse for persons with than without OLD [$\beta = -0.05$ (-0.10 to <0.001)] (Table 2 and Supplementary Table 4).

Cognitive Processing Speed

Persons with OLD had lower scores on cognitive processing speed. They had a higher mean duration to first press the snap-button

Table 2
Cognitive Functioning in Persons With and Without OLD

	Persons with OLD (n = 5764)	Persons without OLD (n = 37,275)	Unadjusted P Value	Standardized Coefficient Beta (β) (95% CI)*	Adjusted P Value*
Prospective memory test (persons with correct recall on first attempt), n (%)	4235 (73.5%)	29 381 (78.8%)	<.005	-0.15 (-0.22 to -0.09)	<.005
Fluid intelligence test (number of correct-answers), mean (SD)	5.9 (2.1) [‡]	6.1 (2.1)	<.005	-0.05 (-0.11 to 0.003)	.065
Pairs matching test round 1 (number of mistakes), median (IQR) [†]	0.0 (0.0–1.0)	0.0 (0.0–1.0)	<.005	0.06 (0.03–0.10)	<.005
Pairs matching test round 2 (number of mistakes), median (IQR) [†]	4.00 (2.0–6.0)	3.0 (2.0–5.0)	<.005	0.09 (0.00–0.18)	.047
Numeric memory test (longest number correctly recalled), median (IQR) [†]	7.0 (6.0–8.0)	7.0 (6.0–8.0)	<.005	-0.05 (-0.10 to 0.00)	.047
Reaction time test (time in milliseconds), median (IQR) [†]	555.0 (493.0–637.0)	539.0 (481.0 –615.0)	<.005	4.62 (1.25–8.01)	.007

CI, confidence interval; IQR, interquartile range; OLD, obstructive lung disease; SD, standard deviation.

*Based on linear regression analysis with robust standard errors or logistic regression analysis (only prospective memory was a dichotomous variable) with non-OLD as reference category and after correction for sex, age, race, education, employment, current tobacco smoking, alcohol intake, depressed mood in the last 2 weeks, vascular/heart problems diagnosed by doctor, and diabetes diagnosed by doctor.

[†]Nonparametric statistical tests have been used because of skewed data.

[‡]For one person with OLD the fluid intelligence test data are missing.

Table 3
Correlations Between Cognitive Functioning and FEV₁ and FVC in Persons With OLD

	Correlation Coefficient	P Value	Standardized Coefficient Beta (β) (95% CI) ^a	Adjusted P Value ^a
FEV₁				
Prospective memory test	0.13 [†]	<.005	0.004 (0.00–0.01)	.028
Fluid intelligence test [‡]	0.18 [†]	<.005	0.003 (0.00–0.01)	.052
Pairs matching test round 1	–0.09 [‡]	<.005	<0.001 (–0.001 to 0.002)	.938
Pairs matching test round 2	–0.07 [‡]	<.005	–0.002 (–0.01 to 0.003)	.376
Numeric memory test	0.20 [‡]	<.005	0.01 (0.003–0.01)	<.005
Reaction time test	–0.20 [‡]	<.005	–0.09 (–0.27 to 0.08)	.288
FVC				
Prospective memory test	0.11 [†]	<.005	0.07 (0.006 to 0.14)	.073
Fluid intelligence test [‡]	0.17 [†]	<.005	0.14 (0.08 to 0.21)	<.005
Pairs matching test round 1	–0.09 [‡]	<.005	–0.01 (–0.05 to 0.02)	.509
Pairs matching test round 2	–0.08 [‡]	<.005	–0.13 (–0.24 to 0.01)	.028
Numeric memory test	0.19 [‡]	<.005	0.15 (0.10 to 0.21)	<.005
Reaction time test	–0.19 [‡]	<.005	–2.82 (–6.22 to 1.65)	.256

CI, confidence interval; FEV₁, forced expiratory volume in the first second; FVC, forced vital capacity; OLD, obstructive lung disease.

^aBased on linear regression analysis with robust standard errors or logistic regression analysis (only prospective memory was a dichotomous variable) after correction for sex, age, race, education, employment, current tobacco smoking, alcohol intake, depressed mood in the last 2 weeks, vascular/heart problems diagnosed by doctor, and diabetes diagnosed by doctor.

[†]Pearson correlation coefficient.

[‡]Spearman rank correlation coefficient. n = 5764.

[§]For one person with OLD the fluid intelligence test data are missing.

summed over rounds in which both cards matched (Table 2). This was confirmed by linear regression analysis after correction for confounders. [$\beta = 4.62$ (1.25–8.01)] (Table 2 and Supplementary Table 5).

Relationship Between Lung Function and Cognitive Functioning

Bivariate analysis demonstrated that impairment in prospective memory, fluid cognitive functioning, numeric short-term memory, visuospatial memory, and cognitive processing speed are related with impairment in FEV₁ in persons with OLD. However, all correlations were weak (Table 3). The relationship between FEV₁ and prospective memory [$\beta = 0.004$ (<0.001–0.01)] and numeric short-term memory [$\beta = 0.01$ (0.003–0.01)] remained significant after adjustment for confounders (Table 3 and Supplementary Tables 6–10).

Bivariate analysis demonstrated that prospective memory, fluid cognitive functioning, numeric short-term memory, visuospatial memory, and cognitive processing are weakly correlated with FVC in persons with OLD (Table 3). The relationship between FVC and fluid cognitive functioning [$\beta = 0.14$ (0.08–0.21)], visuospatial memory in round 2 [$\beta = -0.13$ (–0.24 to 0.01)], and numeric short-term memory [$\beta = 0.15$ (0.10–0.21)] remained significant after adjustment for confounders (Table 3 and Supplementary Tables 11–15).

Mild vs Moderate vs (Very) Severe OLD

Linear and logistic regression analysis demonstrated that persons with moderate airflow limitation differed from persons with mild

airflow limitation on fluid cognitive functioning and numeric short-term memory. Persons with (very) severe airflow limitation differed from persons with mild airflow limitation on numeric short-term memory (Table 4).

Discussion

Key Findings

The present study showed that in the general population, persons with OLD have worse scores than persons without OLD on cognitive function tests in the domains memory (prospective memory, visuospatial memory, and numeric short-term memory) and information processing (cognitive processing speed), after correcting for confounding variables. The fluid intelligence test was not significantly different between groups after correcting for confounders. There was a weak relationship between FEV₁, FVC, and several cognitive domains in persons with OLD.

Until now, little research has been done on deficits in specific domains of cognitive functioning. This study demonstrates that persons with OLD have significant lower scores on cognitive measures of prospective memory, visuospatial memory, numeric short-term memory, and cognitive processing speed. This confirms our hypothesis that the results of cognitive functioning of persons with OLD are significantly lower than the results of cognitive functioning of controls.

We did not find differences in scores on the fluid intelligence test. This in contrast to the findings of Emery et al who indicated that FEV₁

Table 4
Comparison of Cognitive Functioning Between Mild, Moderate, and (Very) Severe OLD

Cognitive Function	Mean (SD)		
	FEV ₁ \geq 80% Predicted (n = 3525)	FEV ₁ 50%–80% Predicted (n = 1980)	FEV ₁ <50% Predicted (n = 259)
Prospective memory test	0.75 (0.43)	0.72 (0.45)	0.67 (0.47)
Fluid intelligence test	6.04 (2.11) [*]	5.77 (2.14)	5.66 (2.24)
Pairs matching test round 1	0.55 (1.20)	0.59 (1.20)	0.55 (0.95)
Pairs matching test round 2	4.21 (3.17)	4.21 (3.43)	4.62 (3.45)
Numeric memory test	6.60 (1.71) ^{*†}	6.32 (1.89)	6.21 (1.96)
Reaction time test	575.62 (128.40)	583.88 (124.95)	594.15 (127.97)

FEV₁, forced expiratory volume in the first second; OLD, obstructive lung disease; SD, standard deviation.

^{*}Adjusted P value <.05 compared with FEV₁ 50%–80% predicted based on linear regression analyses with robust standard errors after correction for sex, age, race, education, employment, current tobacco smoking, alcohol intake, depressed mood in the last 2 weeks, vascular/heart problems diagnosed by doctor, and diabetes diagnosed by doctor.

[†]Adjusted P value <.05 compared with FEV₁ <50% predicted based on linear regression analysis with robust standard errors or logistic regression analysis (only prospective memory was a dichotomous variable) after correction for sex, age, race, education, employment, current tobacco smoking, alcohol intake, depressed mood in the last 2 weeks, vascular/heart problems diagnosed by doctor, and diabetes diagnosed by doctor.

predicted performance on tests of fluid cognitive functioning.¹⁷ They used the digit symbol substitution test, the block design test, and the digit span backward test, to test fluid cognitive functioning. Although these tests can be used to measure fluid cognitive functioning, they also measure cognitive processing speed, visuospatial memory, and numeric short-term memory, respectively. This may explain the differences with our findings.

Our hypothesis that airflow limitation is associated with cognitive impairment in persons with OLD was confirmed. In line with previous studies, which stated that cognitive functioning seems to be positively correlated with increased FEV₁ in patients with COPD,^{18,19} we found a weak correlation between cognitive impairment and FEV₁ in persons with OLD. Etner et al¹⁹ found that FVC was a significant predictor of working memory storage in older patients with mild to moderate COPD recruited from the community.¹⁹ We found a weak, but significant correlation between FVC and numeric short-term memory, fluid cognitive functioning, and visuospatial memory in round 2. Furthermore, persons with mild airflow obstruction had better numeric short-term memory scores than persons with moderate or (very) severe airflow limitation. In addition, persons with mild airflow limitation had better fluid cognitive functioning scores compared to persons with moderate airflow limitation. The relationship between lung function and cognitive functioning may be influenced by other factors such as genetic factors,¹⁷ physical activity,²⁰ and smoking.²¹ Therefore, these should be studied to understand the relationship between lung function and cognitive functioning.

Although there is evidence that prospective memory, visuospatial memory, fluid cognitive functioning, and numeric short-term memory require different aspects of executive functioning and processing speed supports many higher-order cognitive domains, no firm conclusions can be made whether and to what extent persons with OLD perform particularly worse on the cognitive domain executive functioning. Fluid cognitive functioning is often described as executive functioning.²² However, these constructs cannot be equated. The correlations between latent factors indicate approximately 50% shared variance between them.²³ A more elaborated testing battery that measures the different components of executive functioning might give a better insight in the role of executive functioning in chronic respiratory diseases.

Methodological Considerations

Several methodological considerations should be considered in interpreting the results. First, the classification OLD was based on the fixed ratio of FEV₁/FVC. We were unable to distinguish between asthma, bronchiectasis, bronchitis, and COPD. Comorbidities like blood clot, deep vein thrombosis, bronchitis, emphysema, asthma, and rhinitis were grouped in the database, and, therefore, we were unable to split comorbidities within 1 group for further analysis. Furthermore, persons with severe COPD seem to be underrepresented in this study. However, the distribution of airflow limitation in this study is representative of the distribution of COPD in the general population.^{24,25} Second, all used cognitive tests concerned visual spatial information, which is unelaborated. More detailed neuropsychological assessment is needed to explore other domains of cognitive functioning in OLD and to control for differences such as motor skills or visual difficulties. Nevertheless, previous studies often only used 1 scale to measure global cognitive functioning (eg, the Mini-Mental State Examination),^{9,26} while the current study used a concise testing battery to measure 5 domain-specific cognitive skills. Next to cognitive functioning, other aspects of executive functioning should be investigated in future studies to get a better insight in the role of executive functioning in respiratory diseases. Third, no data

were available regarding impact of cognitive impairment in various domains on clinically relevant outcomes (eg, health-related quality of life, exacerbations, and mortality). Also, data on other possible confounders, such as hypoxemia, long-term oxygen therapy,^{27,28} obstructive sleep apnea, and overlap syndrome,²⁹ which may affect cognitive functioning, are lacking. Finally, we adjusted for symptoms of depression assessed by a single touchscreen question instead of the presence of a major depression disorder diagnosed by a clinician.

Clinical Implications

Previous studies showed adverse consequences of cognitive impairment in general on health status and daily functioning in patients with COPD^{7,8,26} but offered no insight in the consequences of cognitive impairment in specific cognitive domains in persons with OLD. The effects of deficits in domain-specific cognitive skills such as prospective memory, visuospatial memory, numeric short-term memory, and cognitive processing speed have been studied in other populations. For example, prospective memory deficits may lead to intrusive doubts and checking compulsions,³⁰ unemployment,³¹ and impaired financial capacity and medication management.³² Visuospatial memory deficits may lead to disorientation³³ and a reduction in the amount of slow wave sleep and in sleep efficiency.³⁴ Persons with impairment of cognitive processing speed will take longer to process and respond to verbal, visual, or written information.³⁵ Also, in patients with COPD, many daily situations could be influenced by impaired cognitive functioning.³⁶ Therefore, our findings highlight the importance for healthcare professionals to be alert to the possible impact of these cognitive difficulties in the self-management, clinical management, and pulmonary rehabilitation of persons with chronic respiratory diseases.

Previous studies showed that smoking is associated with prospective memory deficits and the impact of nicotine on long-term prospective memory may be dose dependent.³⁷ Taking into consideration that cigarette smoking is the leading cause of COPD,² smoking prevention and cessation should be encouraged to prevent and improve prospective memory. Etner and Berry found an association between improved fluid cognitive functioning and aerobic fitness following an exercise intervention for 3 months in patients with COPD.²⁰ Further research is needed to confirm whether physical activity leads to cognitive gains in a wider population with chronic respiratory diseases. A case-control study of pulmonary rehabilitation suggested that if visuospatial functions were impaired at baseline, they improved after 3 weeks of treatment.³⁸ Further, short-term visuospatial memory in healthy controls has been shown to be strongly related with executive functioning.³⁹ Therefore, the effects of pulmonary rehabilitation on cognitive functioning in specific cognitive domains should be further explored. Future studies should focus on interventions for improving cognitive functioning and adjusting treatment programs, such as education and self-management, for cognitively impaired patients with respiratory diseases.

Conclusions

The present population-based study shows that persons with OLD may experience cognitive impairment in different domains, which could be related to impaired lung function. Therefore, cognitive impairment should be considered as an important extrapulmonary manifestation of COPD. In particular, the domains memory and information processing are affected, which can have important consequences for self-management skills. Further assessment of domains of cognitive functioning and the relationship between cognitive impairment and patient-related outcomes is needed to optimize patient-oriented treatment and self-management programs for

patients with chronic respiratory diseases. Future studies should also assess the effects of pulmonary rehabilitation and lifestyle factors on the relationship between lung function and cognitive functioning in patients with COPD. Hereby it is important to take premonitory ability and longitudinal change in cognitive functioning in persons with OLD into account to explore a potentially causal relationship.

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Supplementary Data

Supplementary data related to this article can be found online at <http://dx.doi.org/10.1016/j.jamda.2013.12.007>.

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